

THE IRON AGE

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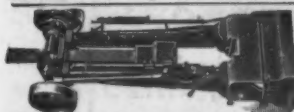
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THE IRON AGE

New York, Thursday, September 7, 1905.

A Process for Converting Fine Iron Ores Into Nodules.

A plant which went into operation in August on the Hackensack Meadows of New Jersey represents the beginning of what promises to be an important development in the treatment of fine iron ores for use in Eastern blast furnaces. It is of particular interest also to furnaces whose ores contain sulphur, to those using any considerable percentage of concentrates and to furnaces running on high percentages of Mesaba ores from which heavy accumulations of flue dust result. The process employed at the plant in question is covered by a patent on "a method of purifying and nodulizing metallifer-

ous materials" recently granted to Tom Cobb King and assigned to the National Metallurgic Company of 43 Exchange place, New York. As employed at the New Jersey plant it deals chiefly with pyritic cinder, the well-known "blue billy," which is the residue from the treatment of iron pyrites for the production of sulphuric acid. The quantity of sulphur usually remaining in this cinder as it comes from sulphuric acid works has heretofore

prevented the use of much of it in the blast furnace and large quantities have accumulated at chemical works. The inventor, referring to the attempts thus far made to utilize fine ores and flue dust by employing "binders" and manipulating the ore in a rotary kiln or by briquetting, says that the unsatisfactory results from these efforts have been due to the use of binders that have increased the impurities in the mass instead of aiding in eliminating them. The present process differs from those mentioned in that it employs tar (though patent claims are made also on other adhesive substances and

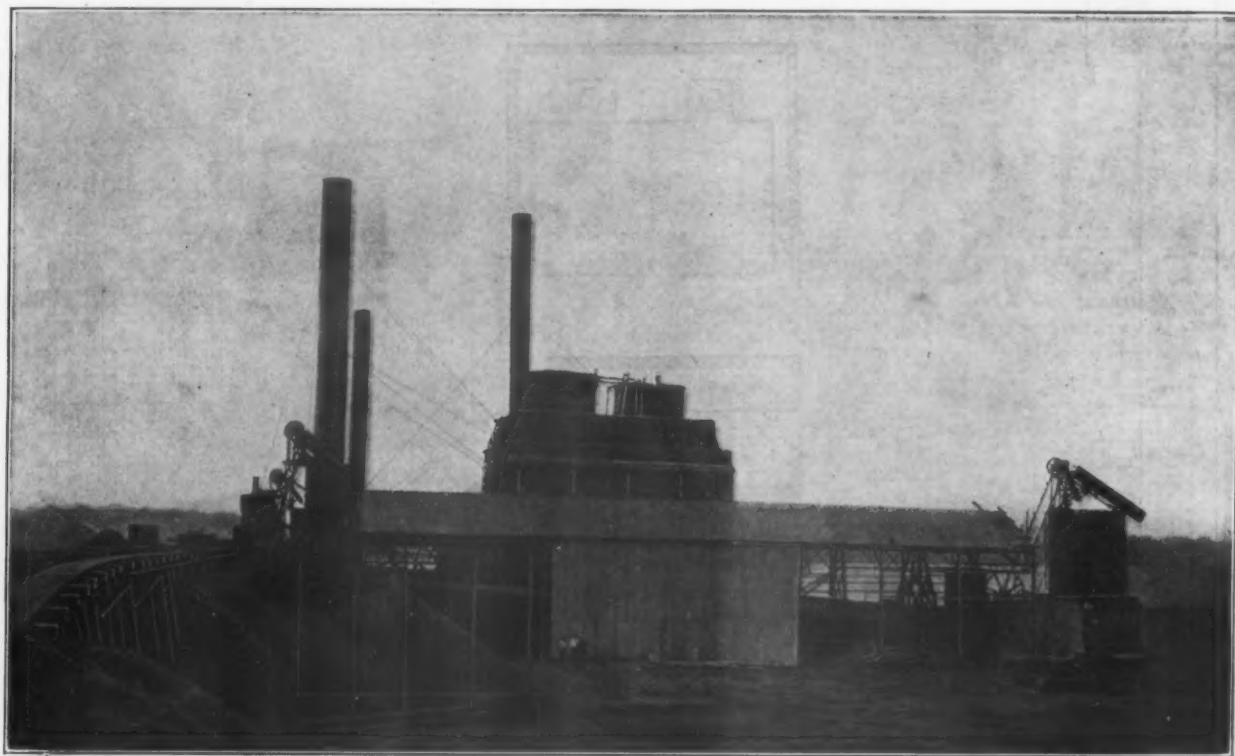


Fig. 1.—Plant of the National Metallurgic Company on Newark Bay, N. J., for the Production of Ore Nodules from Fine Ores.

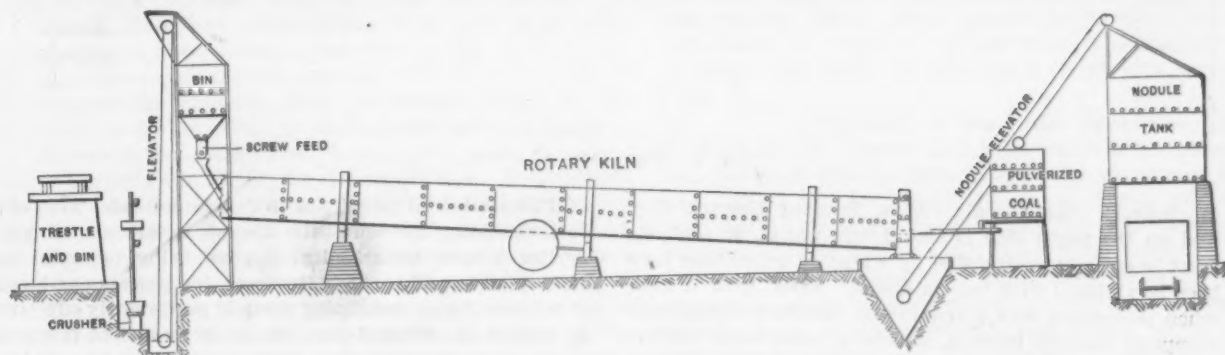


Fig. 2.—Elevation of Ore Storage and Feed Bins, Rotary Kiln and Nodule Conveying and Storage Plant.

ous materials" recently granted to Tom Cobb King and assigned to the National Metallurgic Company of 43 Exchange place, New York. As employed at the New Jersey plant it deals chiefly with pyritic cinder, the well-known "blue billy," which is the residue from the treatment of iron pyrites for the production of sulphuric acid. The quantity of sulphur usually remaining in this cinder as it comes from sulphuric acid works has heretofore

carbohydrate compounds) which has an affinity for and forms volatile compounds with such impurities as sulphur and arsenic. Along with these impurities it is gradually volatilized, the iron oxides being converted into nodules of any desired size, free from moisture. The adhesive substance is not used to bind the particles of ore together permanently, but its function is to bind them initially, and in the progress of the ore through the rotary

kiln used for the production of nodules aid in fusion, the final product being permanently coherent nodules containing substantially no fixed foreign compounds.

It is found that the size of the nodules can be regulated by varying the quantity and quality of the binder, the degree of heat and the rapidity of movement of the ore through the kiln. In practice under Mr. King's process the addition of 1 per cent. of pitch to 99 per cent. of an ore analyzing 67 per cent. metallic iron and 1 per cent. silica produces nodules about the size of a goose egg, a size adapted to open hearth work, while $\frac{1}{2}$ per cent. of pitch added to 99 $\frac{1}{2}$ per cent. of the same ore produces nodules the size of a partridge egg, the size best adapted to blast furnace practice.

The Plant on the Hackensack Furnace Site.

In March of this year the National Metallurgic Company purchased the 15-acre tract of land formerly occupied by the New Jersey Zinc Company as a site for its Hackensack Furnace. The furnace, which had then been abandoned for some months, had been operated for the production of spiegel. The site is at the junction of the

bins or from the stock piles is mechanically conveyed to a rotary kiln for treatment. The company has rebuilt the old dock on the property for unloading the barges which bring the ore to the plant, the depth of water off the dock being 14 feet. A stiff-leg derrick has been provided, equipped with an orange peel bucket of $1\frac{1}{2}$ cubic yards capacity, capable of taking about $1\frac{1}{2}$ tons of ore. The capacity of the derrick is 300 tons in 24 hours. The unloading is accomplished by one man, who operates the derrick by means of a hoisting engine of the Crane type. A McMyler locomotive traveling crane of 10 tons capacity assists in discharging the barges, besides operating at any point along the trestle or on the railroad tracks on the property. The ore is unloaded into Goodwin steel cars of a capacity of 60 tons, the weight of the cars being 60,000 pounds.

Treatment of Pyritic Cinder.

The ore at present being put on the company's dock and on which the plant has been operated for the past two weeks is a pyritic cinder, resulting from the burning of iron pyrites, mined by the Newfoundland Syndicate at

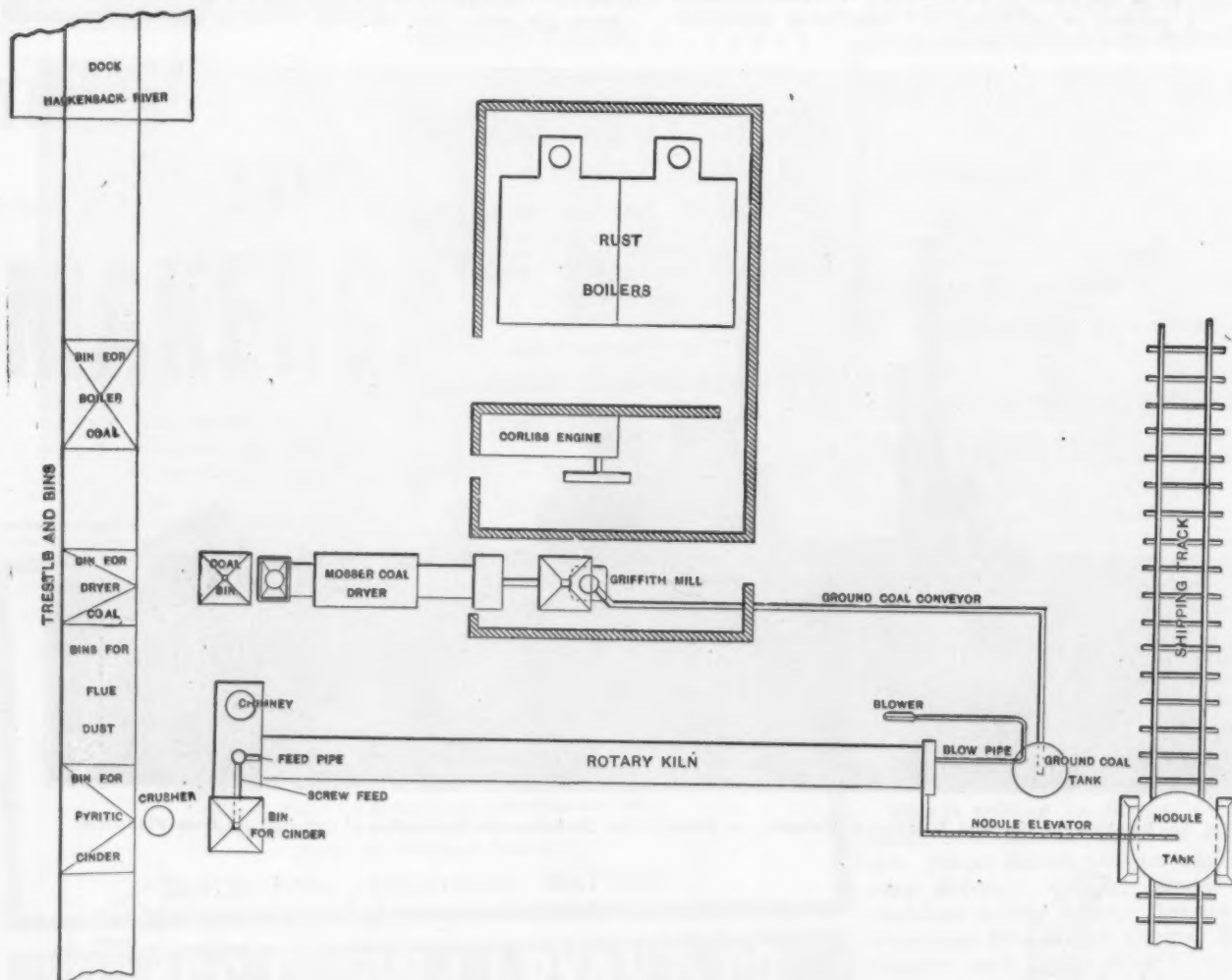


Fig. 3.—Plan View of Plant.

Hackensack and Passaic rivers, forming Newark Bay, and on the north side is the Morris Canal, so that the tract is entirely surrounded by water. Connections have been established with two railroads. Since April 1, 1905, when possession was given to the National Metallurgic Company, the old furnace, its stoves, stockhouse, boilers and engine have been removed, and the New Jersey Zinc Company is now engaged in building a new spiegel furnace on another site.

The National Metallurgic Company has erected what it terms an ore purifying and nodulizing plant with a capacity of 200 tons in 24 hours. The object has been to construct as far as possible an automatic or continuously operating plant, the features of which are referred to in detail below.

The ore, or pyritic cinder, is received by railroad or boat, is stored under a trestle and in bins and from the

its Pilley's Island properties in Newfoundland. This ore is noteworthy as being the lowest in arsenic of any pyrites mined, nonarsenical pyrites being essential in making high grade acids. However, the process employed at the New Jersey nodulizing plant is particularly effective as applied to arsenical ores, as one of its salient features is the removal of sulphur and arsenic from the cinder. The Pilley's Island pyrites average about 48 per cent. sulphur. The resultant cinder after being treated in the rotary kiln gives a nodule that will analyze 60 per cent. iron, 5 per cent. silicon, 1 per cent. alumina, 1 per cent. lime and magnesia and a trace of phosphorus. A ton of pyrites after treatment at the chemical works yields 6-10 ton of cinder.

Referring to the plan and elevation of the cinder treating plant, as given in Figs. 2 and 3, it will be seen that the cars drop the ore into a series of bins under the

trestle. These bins discharge either directly into a crusher or, if the ore is in such a condition of fineness as not to require crushing, into a storage tank located above the feed end of the rotary kiln. From this storage tank the material is conveyed by screw conveyor to a feed pipe which projects down and into the end of the kiln. At the same time that the fine ore is delivered from the storage tank tar is dropped into it as it reaches the end of the screw conveyor farthest from the tank. There is thus a thorough mixing prior to the admission of the ore into the kiln. The tar tank surrounds the exhaust chimney of the kiln, and thus the tar is kept warm and fluid. Held in masses by the preliminary binding of the tar the ore moves along in the kiln under a horizontally rotary motion, encountering different degrees of heat, the temperature increasing toward the farther end of the kiln. Before emerging from the kiln the nodules are agglomerated or permanently semifused; progressing still further they are discharged through a hood and conveyed by elevators to the nodule tank for final disposition.

Coal Drying Plant.

The fusion of the ore is accomplished by the injection of powdered coal into the discharge end of the kiln, and

end of the rotary kiln. The point of fusion in the kiln depends on the amount of air pressure, the fusion zone being either drawn toward the hood or thrust further back toward the feed end, as required by the desired size of ore nodules.

The kiln was constructed by the Riter-Conley Mfg. Company of Pittsburgh, who also erected the building. The kiln is of standard make with the exception that steel castings of double extra strength are employed in many cases. It is of heavy plate construction, is 100 feet long and 7 feet in diameter, being drawn down to 6 feet in diameter at the feed end. It is driven directly from a speeder, and the rate of rotation can be varied 100 per cent., being adjusted to the fusibility of the different materials used. Under normal conditions the ore passes through the kiln in 1 hour and 30 minutes.

The power plant consists of 300 horse-power Rust water tube boilers and a 150 horse-power Corliss engine, manufactured by Hooven-Owens-Rentschler Company, Hamilton, Ohio. The boilers are located as close as possible to the engine, giving little steam condensation and a minimum of piping.

Thus far a pyritic cinder has been operated upon which

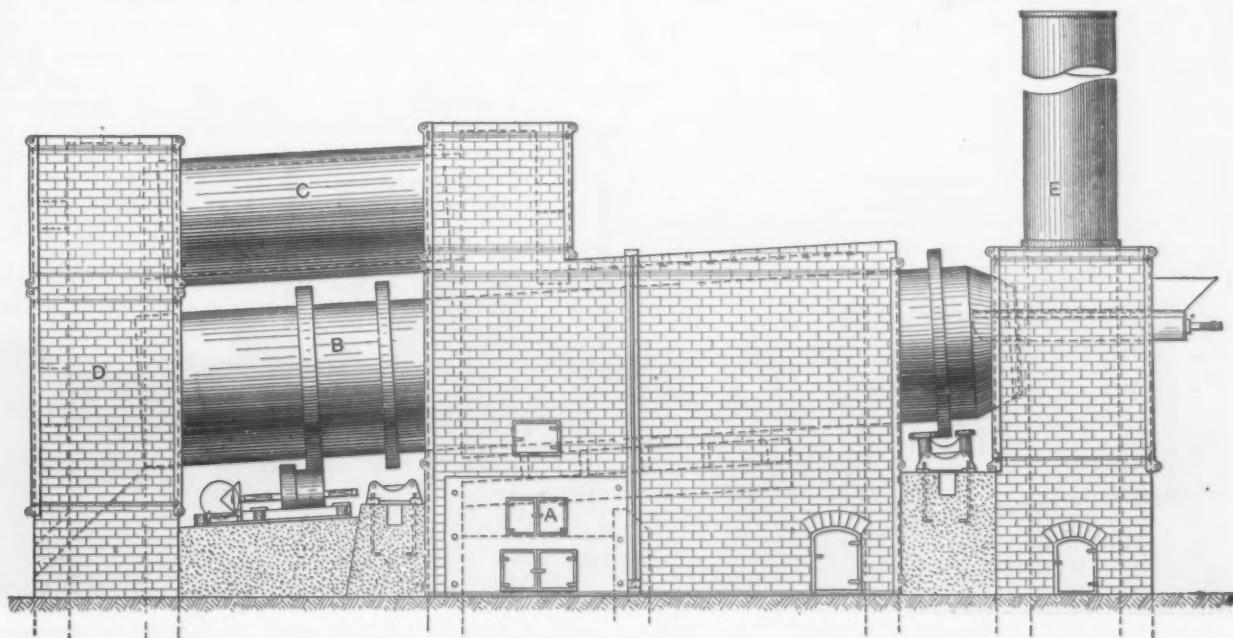


Fig. 4.—Coal Dryer Plant of Special Design.

an important feature of the plant is the coal dryer and its accessories. The dryer is located adjacent to the bins under the trestle, and the coal is carried by conveyors to the dryer bins and through the latter automatically. The dryer deviates from the usual form in that the heated gases and waste products of combustion after passing on the outside of the dryer return to the front, and thence pass directly over the coal dryer to discharge through the chimney stack. A special design for the dryer was worked out by the manufacturers, William F. Mosser & Son, Allentown, Pa.

As shown in Fig. 4, the fire box is at A. The products of combustion pass up and around the stationary cylinder B, thence through the connecting stationary cylinder C, down through the passageway D, and back through the cylinder B, exhausting through the stack E. The coal, which is gas slack, the only requirement being a coal of long flame, is constantly rotated and the cylinder is divided into four compartments by 10-inch angle irons. By the rolling or tumbling of the cylinder all particles of coal are brought into direct contact with the heated gases and the heating surface.

From the dryer the coal is discharged into a bin from which it is conveyed to a Griffith mill. The latter runs at 1800 revolutions and produces a ground coal of which 90 per cent. will pass a 100-mesh sieve. A screw conveyor brings it to the ground coal tank, as indicated in Fig. 2; thence it is propelled by screw conveyor and dropped into a blow pipe, a fan blowing it into the hood at the discharge

gives a product extremely low in phosphorus. In the treatment of flue dust a product was obtained grading as follows, as to size: Seventy per cent. failed to pass a $\frac{1}{4}$ -inch mesh screen, varying in size from $\frac{1}{4}$ to $\frac{3}{4}$ inch; 20 per cent. remained on a $\frac{1}{8}$ -inch mesh screen. Naturally the chemical content of the nodules produced varies with the cinder from which they originate. The analyses already accumulated range from 55 to 68 per cent. metallic iron.

Nodulizing of Ores at the Mine.

As has been already intimated the field of the process described above is broader than the operations thus far carried on. Its use for the conversion of flue dust into nodules is under consideration, the flue dust problem having assumed no small proportions under the increasing use of Mesaba ores. But a more important field is capable of development by the installation of ore nodulizing plants at Lake Superior iron mines, whose ores are of unusual fineness. The removal of moisture from Lake Superior ores previous to their shipment from the mine has been agitated for a number of years, and at the 1902 meeting of the Lake Superior Mining Institute Dr. Nelson P. Hulst presented some of the results of his investigation of the problem for the Oliver Iron Mining Company. He showed that of the shipments of 20,593,537 tons of ore from the Lake Superior region in 1901, 3,356,242 tons contained 12 per cent. of moisture and above and 6,077,737 tons contained 10 per cent. and up to 12 per cent. These ores higher in moisture constituted 46

per cent. of the entire shipments of that year. It has been considered a commercial proposition to dry these ores at the mine, but prosperity has pushed any serious operation in this direction into the future. A process that removes moisture and at the same time converts the ore into such form that practically no flue dust is produced is naturally important to Lake Superior mining interests, as well as to furnacemen using Lake ores, and it may be stated that some steps are in contemplation for such an application of the process above described.

The Canadian Rail Bounty.

Past Payments to Be Investigated.

TORONTO, September 1, 1905.—The order in Council taking steel rails from the list of rolled products for whose manufacture bounties are paid is not to be the end of the matter. The Ottawa authorities have also determined upon a re-examination of the grounds on which

ways been regarded as belonging to the "commodities" list. The Minister of Railways and Canals would place an order for 25,000 tons or any other quantity with a British, a German, an American or a Canadian manufacturer at a price arrived at by direct negotiation. The new Auditor-General doubts that Parliament intended the Government to have this free hand, and it is intimated that he will ask Parliament for an expression of its sense on this question. If he establishes the rule of tendering for steel rails on Government account he may cause a distribution of the Government's rail business that was not foreseen. Rails for the Intercolonial Railway system are duty free. Rails for the 1800 miles of the Eastern Division of the National Transcontinental Railway are to be subject to duty, though the division is to be built and owned by the Government through a commission. Legal opinions have been rendered, however, to the effect that the provision for the imposition of the duty may be evaded or disregarded. As a matter of fact, the payment of duty means but the disbursement by one

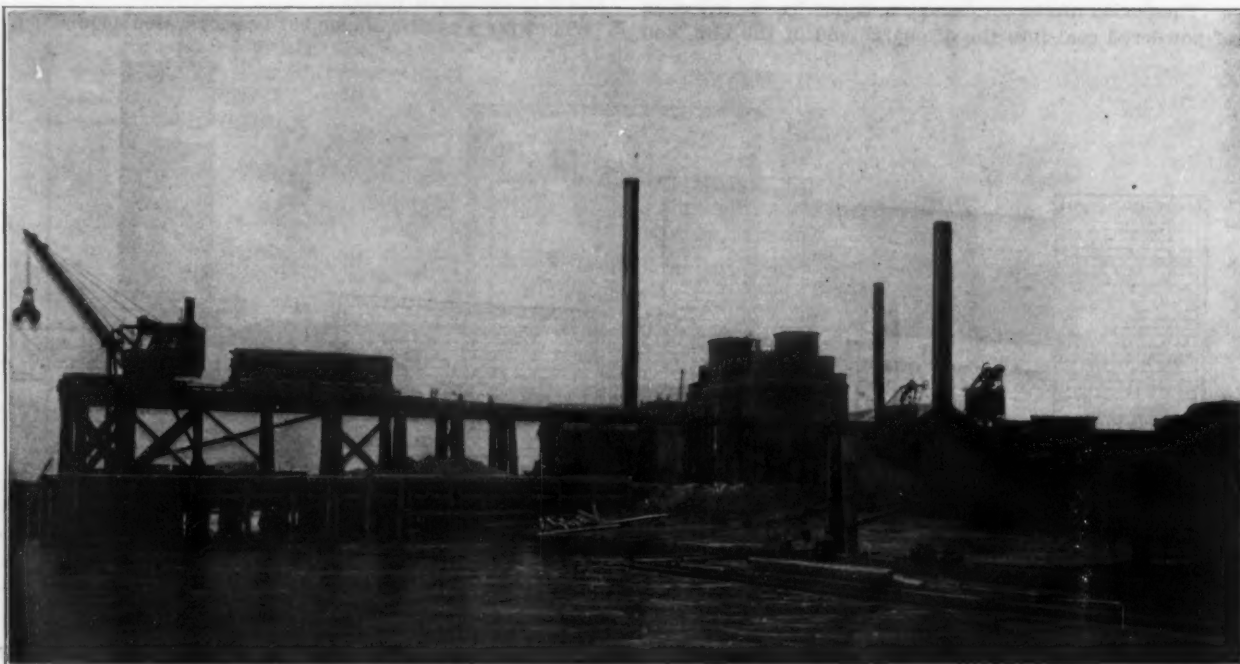


Fig. 5.—View of the Dock, Trestle and Unloading Equipment of the National Metallurgic Company.

the payments were made in the past. As has been stated in these columns, it did not appear to be the intention of Parliament to include steel rails in the bounties provided for in the act of October, 1904. But a claim was made by the Algoma Steel Company for \$61,000 on account of steel rail bounty. The Department of Justice decided that the claim was invalid, but on the advice of a lawyer of very high standing that the expression, "other rolled products," &c., covered steel rails, the Auditor-General of that time permitted the account to be paid. The new Auditor-General, Mr. Fraser, takes the view that the right of the company to the money it has thus received ought to be judicially established, and he has held back \$61,000 that is now due the company as bounty on pig iron and steel billets. The company will have to sue to obtain what is coming to it as bounty money on pig iron and billets. Of course the Government will give its consent to the action, and the courts will be asked to decide as to the meaning of Parliament. If the court finds that steel rails were not provided for in the act that decision will be final. But the company might be permitted to appeal from an order to return the money it has received as rail bounty and the case might thus go to the Supreme Court of Canada.

Steel Rail Purchases on Bids.

Heretofore it has been the Government's practice to treat the "commodities" required in the public service as distinct from expenditures for public works. The requirement that contracts on public works shall be disposed of by bids has not been held to apply to commodities. Steel rails have al-

ways been regarded as belonging to the "commodities" list. The Minister of Railways and Canals would place an order for 25,000 tons or any other quantity with a British, a German, an American or a Canadian manufacturer at a price arrived at by direct negotiation. The new Auditor-General doubts that Parliament intended the Government to have this free hand, and it is intimated that he will ask Parliament for an expression of its sense on this question. If he establishes the rule of tendering for steel rails on Government account he may cause a distribution of the Government's rail business that was not foreseen. Rails for the Intercolonial Railway system are duty free. Rails for the 1800 miles of the Eastern Division of the National Transcontinental Railway are to be subject to duty, though the division is to be built and owned by the Government through a commission. Legal opinions have been rendered, however, to the effect that the provision for the imposition of the duty may be evaded or disregarded. As a matter of fact, the payment of duty means but the disbursement by one

At all events, the new Auditor-General may throw open somewhat widely the door of the Dominion Government's rail trade.

C. A. C. J.

The battle ship Vermont was successfully launched at the yard of the Fore River Shipbuilding Company, Quincy, Mass., on August 31. It is one of the largest and most powerful battle ships yet laid down for the United States Navy. The general dimensions are as follows: Length of load water line, 450 feet; breadth extreme at load water line, 76 10-12 feet; displacement, 16,000 tons. In the main battery there will be four 12-inch, eight 8-inch and 12 7-inch guns. The engines will be of the vertical twin screw four-cylinder triple expansion type, of a combined indicated horse-power of 16,500. There will be 12 Babcock & Wilcox boilers placed in six water-tight compartments.

The Pittsburgh & Lake Erie Railroad has recently built at its McKeesport, Pa., shops two steel flat cars of 150,000 pounds capacity each, designed for the transportation of unusually heavy castings. The car body is built of steel structural shapes. The car is 30 feet long and 9 feet 6 inches wide over sills. The six longitudinal steel sills are each 20 inches deep at the center and 13 inches deep at the bolsters. They are I-beams, made up of 7-16 inch web plate, with angles 5 x 3½ x ¾ inches, weighing 16 7-10 pounds per foot. The weight of the car is 48,200 pounds.

British Industrial Notes.

The Iron Market.

LONDON, August 26, 1905.—There can be no doubt of a growing confidence in the near future. A number of advances in price have been announced during the past few days. The Scotch steel makers have raised angles and bars 2 shillings 6 pence per ton, the first advance since April, 1903. Other Scotch makers have raised the price of special iron brands by 1 shilling to 1 shilling 6 pence per ton. The Scotch Malleable Iron Trade Association raised all classes of bars and hoops by 2 shillings 6 pence per ton. Another Scotch advance is in iron plates, which have gone up 2 shillings 6 pence per ton, to £6 7s. 6d., less 2½ per cent., delivered at Clyde stations. The Midland Association of makers of strip iron have decided to restore the 2 shillings 6 pence per ton taken off two months ago, bringing the price back to £5 17s. 6d. for large lots and £6 for small orders. The galvanized sheet makers have decided to make a further advance of 2 shillings 6 pence in the export price of heavy gauge corrugated sheets. This brings the price up to £10 17s. 6d., but £11 is being secured in many instances, and the mills are all working full time. The export of galvanized sheet iron is a noticeable feature. It is possible that this stiffening of price is in some measure due to the settlement of the cotton factory dispute in Lancashire.

Finished iron is not following this improved tendency quite satisfactorily, but even in this department business is better. The demand for bars is beginning to open out and manufacturers have every reason to expect steady occupation for some time to come.

The steel market maintains its strength. In sheet bars good contracts have been made, some running well into next quarter. A certain quantity has been put on the market at 89 shillings, but the general quotation is 90 shillings.

The German Steel Syndicate on Dumping.

The German Steel Syndicate of Düsseldorf, which controls an annual production of 9,000,000 tons, has submitted replies to a series of questions by the German Government. There were complaints from German finishing mills to the Government Commission on Trusts and Syndicates that the trust sells abroad at lower rates than at home, thus assisting British and Belgian mills to compete with German finishing works. In answer the memorial states that the steel trust is compelled to dispose in foreign markets of the surplus production made by the syndicated works, but that it does not follow a policy of dumping, which is regarded as injurious and likely to lead to reprisals. In fixing export prices the trust only goes as far as is necessary to obtain orders and not allow them to pass into the hands of competitors. Since the trust was formed, in March, 1904, it has tried to keep the export of partly manufactured steel within measurable bounds. The memorial adds that by regulating the export trade it has been possible to obtain higher prices in foreign markets and at the same time devote greater attention to the inland trade. According to statistics cited the exports of semifinished steel mainly concern Great Britain and Belgium. In 1904 the exports of this class to Great Britain amounted to 215,118 tons, and as the total consumption in Great Britain was 5,588,000 tons, the quantity supplied by Germany only represented 3.8 per cent. of the total used. This quantity, the trust states, is too small to increase the competitive powers of the British finishing mills over their German rivals.

It is pointed out further that the exports of the trust to Great Britain principally comprise billets for the production of wire and sheet bars, mostly for tin plates. The decline in the German exports to England, as shown by the statistics for 1904, has not increased the prices of English semifinished steel, as the Americans came on the scene with supplies which compensated for the reduction from Germany. In addition to this retrogression the exports to Belgium did not increase last year. In view of these considerations the memorial concludes that in no way can proof be adduced that the export activity of the steel trust promotes the interests of

foreign finishing works to the detriment of the German mills, and that there is equally no foundation for the assertion that the exports of steel manufactures from Germany by finishing mills will be brought to a standstill by the policy followed.

Trolley and Wire Standards.

The Engineering Standards Committee has issued reports concerning trolley groove and wire and standard specifications for telegraph material. The Subcommittee on Electric Tramways, without restricting engineers to the use of any particular design of wheel, suggests that overhead work be so arranged as to permit of employing the following standard trolley wheel groove: Width, 1½ inches; depth, ¾ inch; radius, 7.32 inches, angle, 65 degrees. The figures recommended as the minimum tensile breaking strengths, in tons per square inch, for standard trolley wires are: Up to and including 00 S.W.G., not less than 24; above 00 S.W.G., not less than 22.

Profits and Dividends.

The Moss Bay Iron & Steel Company has made a profit of £21,600, compared with £25,600 last year, and pays only 2 per cent. The dividend in this instance was reduced last year from 5 to 3 per cent., and now it is 2 per cent.

The report of Mather & Platt shows a profit of £89,238. A dividend of 7 per cent. was paid, plus a bonus of 3 per cent. on the ordinary shares, while £30,000 is transferred to the reserve account, bringing it up to £230,000. The chairman announced that Sir William Mather had been abroad, partly to investigate new engineering developments in the United States, the acquisition of which in times past had contributed so largely to the prosperity of the company. During his visit he was the recipient of the honor of LL.D. from Princeton University. Thirty-two years ago he founded the Salford Iron Works Science School, when there was little or no provision for technical training of apprentices. The example has been widely followed throughout the country, and now both in Manchester and Salford there are great municipal technical institutions. The directors recently came to the conclusion that the Salford Iron Works School had done its work and that the apprentices could now avail themselves of the complete equipment of the municipal schools. Accordingly, the school would not be reopened. During its existence nearly 1200 students had attended its classes.

Extensions.

Bolckow, Vaughan & Co. propose to appropriate out of profits £56,196 for extensions to the works. A year ago £36,522 went to this purpose. In 1903 special appropriations amounted to £140,750, in 1902 to £78,421 and in 1901 to £117,923.

Vickers, Sons & Maxim have purchased from the Furness Railway Company considerable land for the purpose of constructing another fitting out quay for warships and other large vessels.

Guest, Keen & Nettlefolds intend to erect on a site adjacent to their present works at Dowlais two or three additional blast furnaces of the most modern kind and to install the new plant necessary to deal with the large outputs of which the furnaces will be capable.

Sydney Jessop Robinson, managing director of Wm. Jessop & Son of Sheffield, England, has been elected master cutler for the coming year. He is managing director and vice-president of the Jessop Steel Company of 91 John street, New York, with crucible steel works at Washington, Pa.

Armor Plate Contracts.

The armor plate contracts have been authorized by the Admiralty and are divided among all the makers. Vickers, Sons & Maxim and Beardmore's are classed as one and get only one share between them, but the share is probably larger than the others. John Brown & Co., Cammell, Laird & Co., and Armstrong, Whitworth & Co. have the other shares.

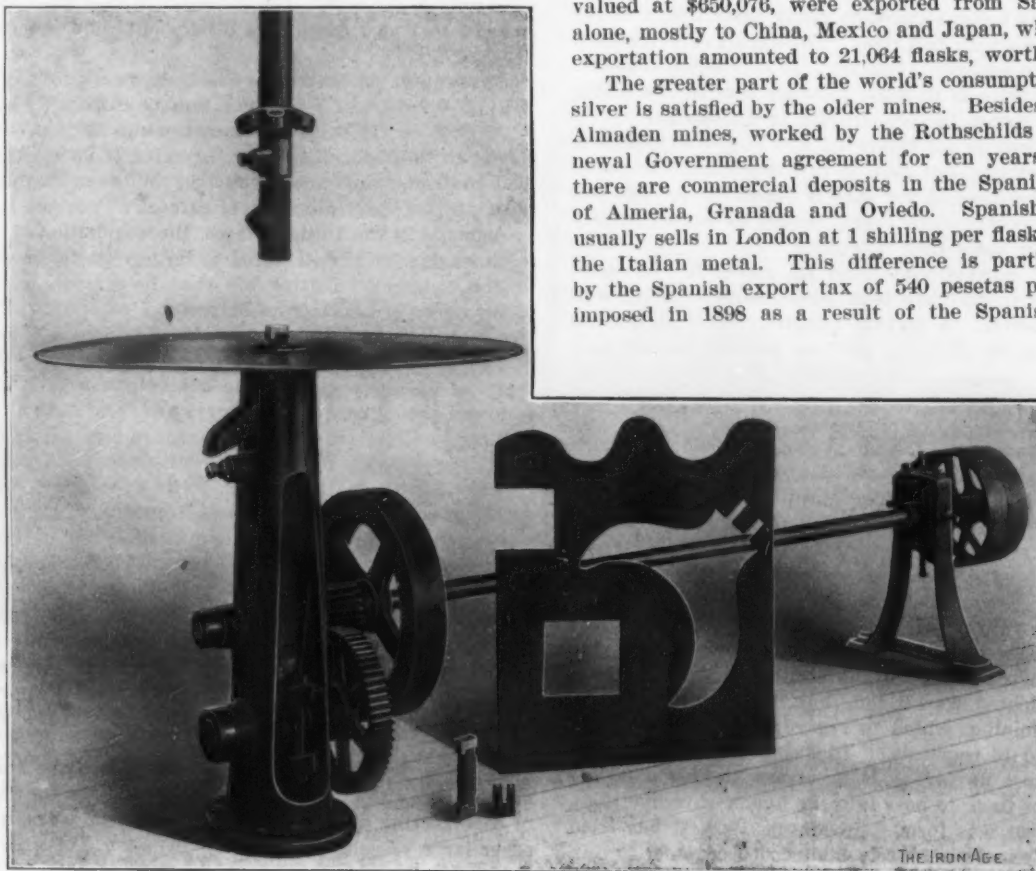
S. G. H.

The report of stocks in the yards of the American Pig Iron Storage Warrant Company shows a total on August 31 of 86,800 tons. On July 31 the total was 93,400 tons. The receipts in August were 1900 tons and the deliveries 8500 tons.

The Davis Universal Shear.

A machine for cutting any desired shape from sheet metal ranging from No. 10 to No. 20 gauge is manufactured by Frank M. Davis & Co., Milwaukee, Wis. The accompanying illustration shows a view of the machine and a sample of the work that it is capable of doing. In using the machine the operator guides the sheet steel to the cutter much the same way as a board is guided to a band saw or a jig saw, following any pattern that may be traced on the metal. The machine will cut either right or left hand curves and will also cut a hole in the center of a square or round sheet in the same manner as a jig saw would cut a board. The cutter resembles a one-tooth saw relieved on the back to enable the turning of short curves. The sheet of metal is always guided by the cutter, so that the operator may easily follow the lines.

The machine is made in two ways, with a stripper connected to and supported by a pipe hung from the ceiling and with a stripper attached direct to the cutter;



The Davis Universal Shear.

where convenient the ceiling suspension of the stripper is more satisfactory, as it allows the making of quick changes. The engraving shows a piece of No. 14 steel cut in an odd shape simply to show the character of the work which the machine is intended for. The machine should run at about 85 to 90 strokes per minute. At this speed it cuts as fast as the operator can guide the metal to the line. One of the features of the machine is that it cuts the steel without stretching the metal and does not distort the sheet. The half-tones of the machine is not quite complete, inasmuch as it does not show the $\frac{3}{8}$ -inch guide rods which brace the suspended member to the steel. These are attached to the yoke shown above the stripper. The distance between the table and the lower end of the stripper is 12 inches. The chips are discharged from the spout extending to the left just beneath the table, and waste is also delivered from the short spout on the stripper. The cutter is in the column of the machine and is driven by an eccentric connected through a single train of reducing gears with the fly wheel driving shaft. A cutter removed from the machine is shown on the floor beside the tool.

The Production of Quicksilver in 1904.

Spain, long the world's leading producer of quicksilver, is now second to the United States. The output of quicksilver in the United States during 1904, as reported to the United States Geological Survey, was 34,570 flasks, valued at \$1,503,795. Up to June 1, 1904, these flasks held $76\frac{1}{2}$ pounds each; since then they have contained 75 pounds each. The production of 1904 was a decrease from that of 1903, which amounted to 35,620 flasks, valued at \$1,544,934.

All the quicksilver produced in this country comes from Texas and California. The production in Texas increased from 5029 flasks in 1903 to 5336 flasks in 1904, a gain of 307 flasks. The production of California in 1904 amounted to 29,217 flasks, as against 30,526 flasks in 1903, a loss of 1309 flasks.

The average price for quicksilver per flask in San Francisco was \$44.10 in 1902, \$45.29 in 1903 and \$43.50 in 1904.

The value of quicksilver imported into the United States in 1904 was only \$1405, whereas 16,351 flasks, valued at \$650,076, were exported from San Francisco alone, mostly to China, Mexico and Japan, while the total exportation amounted to 21,064 flasks, worth \$847,108.

The greater part of the world's consumption of quicksilver is satisfied by the older mines. Besides the famous Almaden mines, worked by the Rothschilds under a renewal Government agreement for ten years from 1900, there are commercial deposits in the Spanish provinces of Almeria, Granada and Oviedo. Spanish quicksilver usually sells in London at 1 shilling per flask higher than the Italian metal. This difference is partly explained by the Spanish export tax of 540 pesetas per 100 kilos, imposed in 1898 as a result of the Spanish American

war. As the Italian output from mines near Monte Auriate, Tuscany, is not large, any variation in the price of other brands would not influence this market appreciably. The Idria mines in Austria rank third in the list of producers, and although they have been worked for 412 years, their ore reserves are estimated to last 40 or 50 years longer at the present rate of mining.

Germany showed an increased consumption of quicksilver in 1904 by importing 1,522,964 pounds and re-exporting only 94,772 pounds. Russia has enlarged the output of its mines in the Ekaterinoslav district, which are worked by A. Auerbach & Co. An appreciable quantity of quicksilver is exported annually from Russia to Hamburg, Germany. In Mexico the great activity in the gold and silver mines has given an impetus to the quicksilver industry, especially in the Guadalcázar district, in San Luis Potosí, and at Huitzoco, in Guerrero. Other deposits are at Ranas, in Querétaro, and at Batuco, in Sonora. Quicksilver occurs also at Yulgibar, in New South Wales; at Huancavelica, in Peru; at Taghit, in Algeria; in Japan, in Germany, and near Akluri, in Turkey.

News of the Iron Ranges.

The Coming Meeting of the Lake Superior Mining Institute.

DULUTH, MINN., August 31, 1905.—The annual meeting of the Lake Superior Mining Institute will be held October 17 and 18 on the Menominee Range. No programme has been arranged and the trip has not been planned, but it will probably cover the main points of interest—Iron Mountain at which are the Chapin and Pewabic mines; Iron River, the location of the River-ton group; Crystal Falls, which contains the well-known non-Bessemer group; Norway and vicinity, embracing the Aragon and the Penn Iron Mining Company mines. A side trip may be taken to Escanaba, where the Chicago & Northwestern docks are located and where the Oliver Iron Mining Company has a great ore crushing plant, and to the Cleveland Cliffs furnace at Gladstone. It was thought that trips might be made to the steel works and furnaces of South Chicago, but this has been given up. This institute has some 400 members and is second only to the American Institute of Mining Engineers.

Ore shipments for the month now closing are less than was expected in the early days, on account of serious delays by flood and minor causes. But they will foot up very heavy, and will bring the year still further above any preceding season to the corresponding date. A number of ships have been laid up all the week at both ends of the lakes, these including many vessels of the two independent fleets of the United States Transportation Company and the Gilchrist, either one of which is good for 125,000 tons of ore a month. The advent of the best wheat and grain carrying fall in many years is not moving rates upward.

The Crystal Falls District.

On the Crystal Falls range the old Armenia mine of Corrigan, McKinley & Co. is about to resume, but it is not probable that pumping will start much if any before the close of the shipping season, and the mine cannot produce before the new year. It is a good property, but its ore is very moist. At the same company's Dunn mine arrangements for extensive operations are under way, and the mine should make a record for itself the coming year. The Dunn is no worked out property as many suppose from its history, but has been rejuvenated and is on the eve of a good career. It will be some time before the water is all out. A new shaft house and large Gates crusher are being put in and all ore requiring reduction will be crushed at the hoist. All summer waste has been dumped into the Great Western open pit by the thousands of yards in a successful effort to save the company's shaft. The ore left in the old workings is being rapidly taken out and the mine will be caved down to the eleventh level. New drifts will be driven at lower levels and a large amount of ore taken out the coming winter. Tobin mine, belonging to the same concern, has been much changed this year by the centralization of all machinery and the wrecking of buildings about the works. The owners are figuring on an electric tramming plant underground, but have let no contracts yet. Other mines of this district are active—the Mansfield has resumed hoisting and Crystal Falls bids fair to see the best year in its history.

The Oliver Iron Mining Company has ordered a generating engine for lighting one of its steam shovels at the Burt mine as an experiment. If as successful as there is reason to expect it will probably be the fore-runner of similar machines on the 50 to 75 shovels it will doubtless operate on the Mesaba range next year. It now has 50 shovels in duty and expects to add about 25 for 1906.

There is a considerable access of interest on the Vermillion range, and more drills are now busy there than for some years. The Oliver Company has one in section 5-62-15, where it did some work several years ago, and where there is an excellent prospect for ore. On section 3-61-15 the Roy and LaChance lands are to be drilled by a number of speculators. These lands lie just south of the Soudan mines and there has been more or less drill exploration around them for 20 years. The

White Iron Lake Company is drilling south of Ely, having resumed the work it stopped nearly a year ago in the magnetic formation there. Drills are running in section 15-62-14, where considerable work has been done in the past by various parties. A drill may be installed on Pine Island, Lake Vermillion. All these explorations are necessarily by diamond drill and are quite costly.

Operations About Hibbing, Minn.

Iron ore shipments out of the village of Hibbing and mines in its immediate neighborhood—that is, within, say, 5 miles east and 3 miles west—are this year about 60,000 tons daily. Most of this comes to lake over the Duluth, Missabe & Northern road, whose normal daily capacity is 50,000 tons, but which serves mines at other points also. The Great Northern road is moving about 20,000 tons from mines along its lines in the neighborhood of Hibbing. More than half a dozen mines are sending out their first season's shipments, these including the Alexandria, Morris, Monroe, Tener, Webb and Myers, while the Leonard and Shenango are getting into line for their first good year. Stripping is in progress at a number of mines in this district, and steam shovels are working in ore at most of the others. At the Monroe and Tener, which will be among the larger shippers of the Mesaba range another year, preparations are being made for the installation of a large cross compound pumping engine, to handle mine water, which is now a very serious problem, for there are from 5000 to 5500 gallons per minute. At this mine three shovels that have been stripping 90 feet of surface have finally reached ore, and men are now cleaning it off in preparation for mining by milling. A stock pile that has accumulated in process of development underground is being shipped. The Oliver Iron Mining Company is erecting a large laboratory at this mine. Development is in progress at three shafts and a large underground electric haulage system for bringing ore from the south end of the property is going in.

Close by these mines are the Pillsbury, Chisholm, Glen, Clark and Leonard, all but the last named the property of the Oliver Company. All four Oliver mines are shipping the daily hoist and by shovels from accumulated stocks. Pillsbury is stripping surface and will mine part of its ore body by shovel, and the latter has now reached the deposit. Leonard has a steam shovel mining in the pit and loading cars which are trammed to the shaft, a sort of steam shovel milling process that is comparatively recent, except at No. 3 pit of Fayal. Leonard pit is very deep, and is being enlarged by steam shovels stripping the surface. Morris mine was opened this year and has been shipping only about 90 days, but is making a large product. There are five shovels at this mine, three stripping and two in the ore. At Pickands, Mather & Co.'s Albany mine, adjoining Morris, a shovel is loading cars on the bottom of the pit, as at Leonard. This mine was opened a year ago. At Webb mine, which has been opened this year by the Shenango Furnace Company, a second shaft is to be sunk shortly. At Winnifred, close by to the north, a shaft is going down to cut the small ore bodies located there some time ago. Just west of these is the Burt, where there are four shovels in ore and two stripping. The product for the year will probably equal that of any mine on the range. Sellers, adjoining Burt and in Hibbing, is loaded from stock by shovel. South of the village is Susquehanna, where a second shaft is being sunk. West of the village is Hull, which is being converted into an open pit mine, and three shovels are working day and night. The haul of waste from this work is 2 miles long, making the work difficult. South of Hull is Agnew, where the International Harvester Company has two shovels, one stripping and one loading ore. West of Hull is Mahoning, where three shovels are in ore and one in stripping. Further west are Leetonia and Cypress, where shovels are loading ore and stripping, and still further is Stevenson, where four shovels are busy. The activity in this stretch of about 8 miles along the range is an indication of what the Mesaba range is doing and is getting ready to do later.

D. E. W.

Car Wheel Forging.

BY JAMES H. BAKER.*

It seems superfluous to say that wrought steel wheels can be made superior to cast iron ones. The questions are, Can the wrought article be made as cheap or cheaper than the cast iron one for a given life of service and to what degree of perfection can the wearing qualities of the tread be brought? This last question also applies to locomotive tires, as it is known that in these there is room for improvement. To show that an article can be produced at a low figure may seem a poor way to

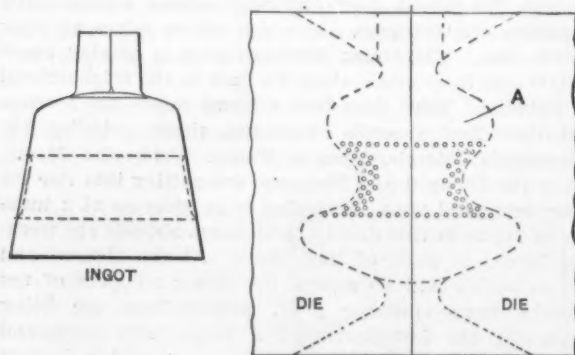


Fig. 1.—The Ingot and the First Forging Operation.

promote a profitable business, but little headway would be made in selling wheels at \$15 each if the customer believed that they cost \$25 and were likely to remain at that cost. As to strength of flanges and general safety of the wrought wheel there can be no question. Wonderful advances have been made in the manufacture of cast iron wheels, but cast iron is not steel. I do not

to have a hard tread necessarily would have a hard hub and that would be an element of danger. Here let me say that the test between hard and soft steel is not which will bend a given amount the oftenest, but which will receive and stand a given strain the greatest number of times; and to this I think we must answer hard steel. Moreover, the last has not been said relative to final treatment of hubs and rims.

Efforts have been made to cast car wheels of steel; also to cast steel blanks and then forge or roll the treads. This is mentioned only because I believe such efforts have done more than anything else to create opinion against forged wheels. The drop forging of blanks for car wheels has been suggested, and this also, I think, can easily be shown to be impracticable.

The improvements in forging referred to below consist generally of a peculiar distribution of the metal, of quick changing, registering and securing dies in position by power while automatically taking care of the blank, and of securing clean welded and forged metal in the tread of the wheel, or tire. Making wrought car wheels consists in forging a suitable blank and then finishing it by rolling. Of the two, forging the blank properly and cheaply is far more difficult than the rolling. As conducted by one process I really think that the forging involves twenty-five times as much labor as the rolling. The essentials in forging are to convert the part intended for the tread into a welded and well forged condition at the start, to closely control the amount of steel desired, to forge by a continuous series of rapidly succeeding operations, to have the work as nearly automatic as possible and to proceed by such easy steps that the use of excessively heavy presses may be avoided, even while using quite hard steel. If a wheel were to be forged of soft steel the difficulties would still exist, but would not be so great as in hard steel, especially as the higher the carbon the less the heat allowable. Hard steel wheels have been forged by the common method, but the power

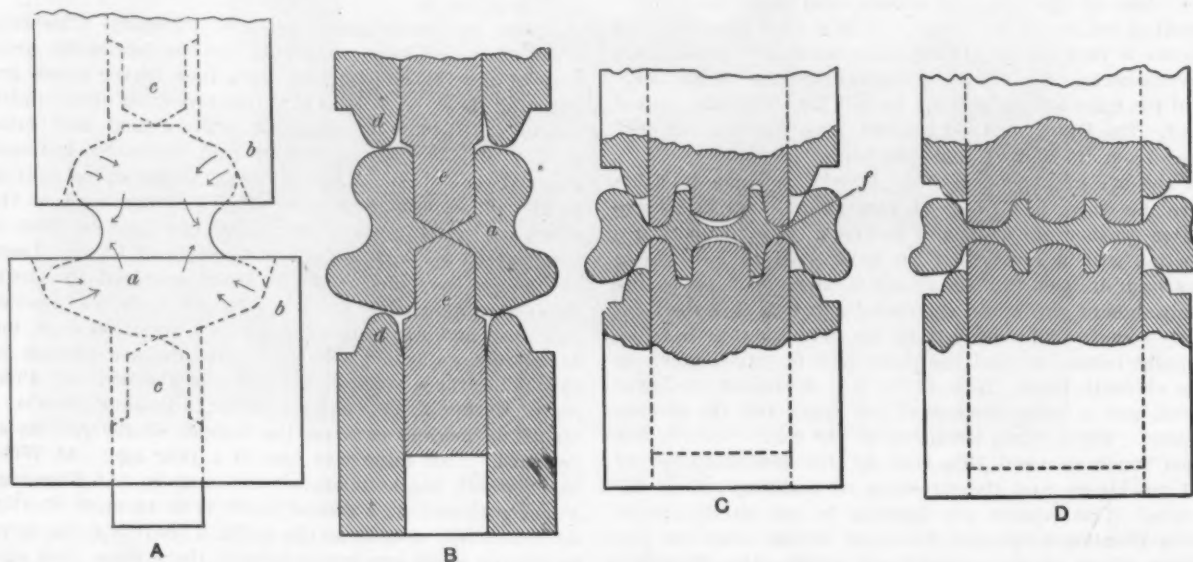


Fig. 2.—The Four Steps in the Working of the Blank in the Forging Press.

claim much as a prophet in saying that the forging of wheels will soon be one of the great industries.

Steel tired wheels are so far superior to cast iron wheels that they bring about five times the price. But why shall we continue to make a center, forge a tire, machine them, fit up retaining devices and assemble the whole when a solid wheel of equal wearing qualities and safety can be made for a small part of the cost and contain less useless weight? It seems clear that a solid forged car wheel can with safety have harder steel in the tread than a steel tire. With special steels for boring and trimming and improved methods of forging this will be produced. The above is not intended to apply to locomotive wheels. One eminent railroad authority told me that the steel tired wheel with its soft center was superior to a solid wheel, because the solid wheel in order

and number of heats required seem prohibitive of producing wheels for general use. While forged wheels cannot be made at as low a price per pound as steel rails one might as well undertake to make rails by casting them of steel as try to cast wheels in steel as cheaply as they can be forged.

Taking a round ingot of the form shown at the left in Fig. 1, with a porter bar cast in or on its top, its central zone is cleaned by turning, as shown by the dotted lines. It is placed at a proper heat in a pair of forging dies, shown at the right in Fig. 1, and rapidly hammered into the blank A, thus converting the outer part of the central zone into well forged steel. This central part being the best of the ingot is taken for the tread of the wheels and the power parts go into the inside of the wheel. This part of the process is interesting. As in the press forging to follow the ingot should be small in

* Solid Steel Tool & Forge Company, Pittsburgh, Pa.

its waist and quite high in proportion to its diameter; the welding produces easily what is wanted.

Coming now to the hydraulic press, the end, or both ends if needed, is now cut off and the blank *a* is placed

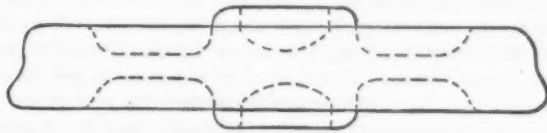


Fig. 3.—The Blank Ready for the Rolls.

in chucking dies, *b b*, as shown at A, Fig. 2. The inner dies *c c* approach each other, while the dies *b b* move somewhat toward each other, thus changing the blank *a* to the form shown in B, Fig. 2. Having been brought between

drawn enough to allow the metal to flow into the cavity in the hub. The use of this high and small diameter ingot makes the forging easier, but even then the congestion of the metal must be relieved. In a flat and therefore wider blank this trouble is much worse.

The forging proceeds with inner and outer dies, as shown in C and D, Fig. 2. Except for some work in bringing the hub to correct height the inner dies are here employed only in holding the blanks. After the operation in C, Fig. 2, the metal is all forced outwardly. The metal at the start flows in the direction of the arrows (A, Fig. 2). This forging is all done at one heat and therefore the blank, as sized by dies, Fig. 1, is not varied in weight by subsequent heating, and furnace scale is avoided, thus making a smooth surface. The blank, Fig. 3, is now ready for the rolls.

Fig. 4 is a photographic reproduction of work done

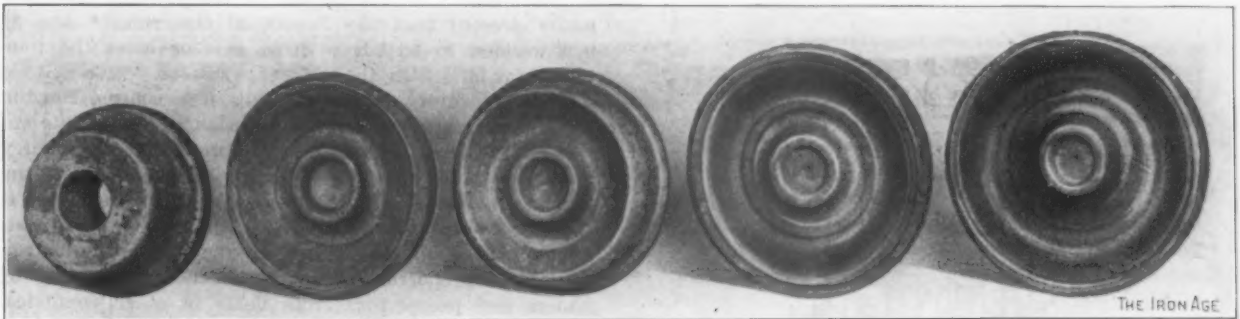


Fig. 4.—Views of the Wheel Blank at Different Stages.

dies *d d* (B, Fig. 2) the dies *e e* are brought together as shown, and the dies *d d* then travel toward each other, moving readily under moderate pressure until the web *f* (C, Fig. 2) gets too thin compared with the thickness

on a blank of different shape from the one described above, the second and third from the left being two views of the blank after the first operation. This work is all done in one press, Fig. 5, the dies being changed by

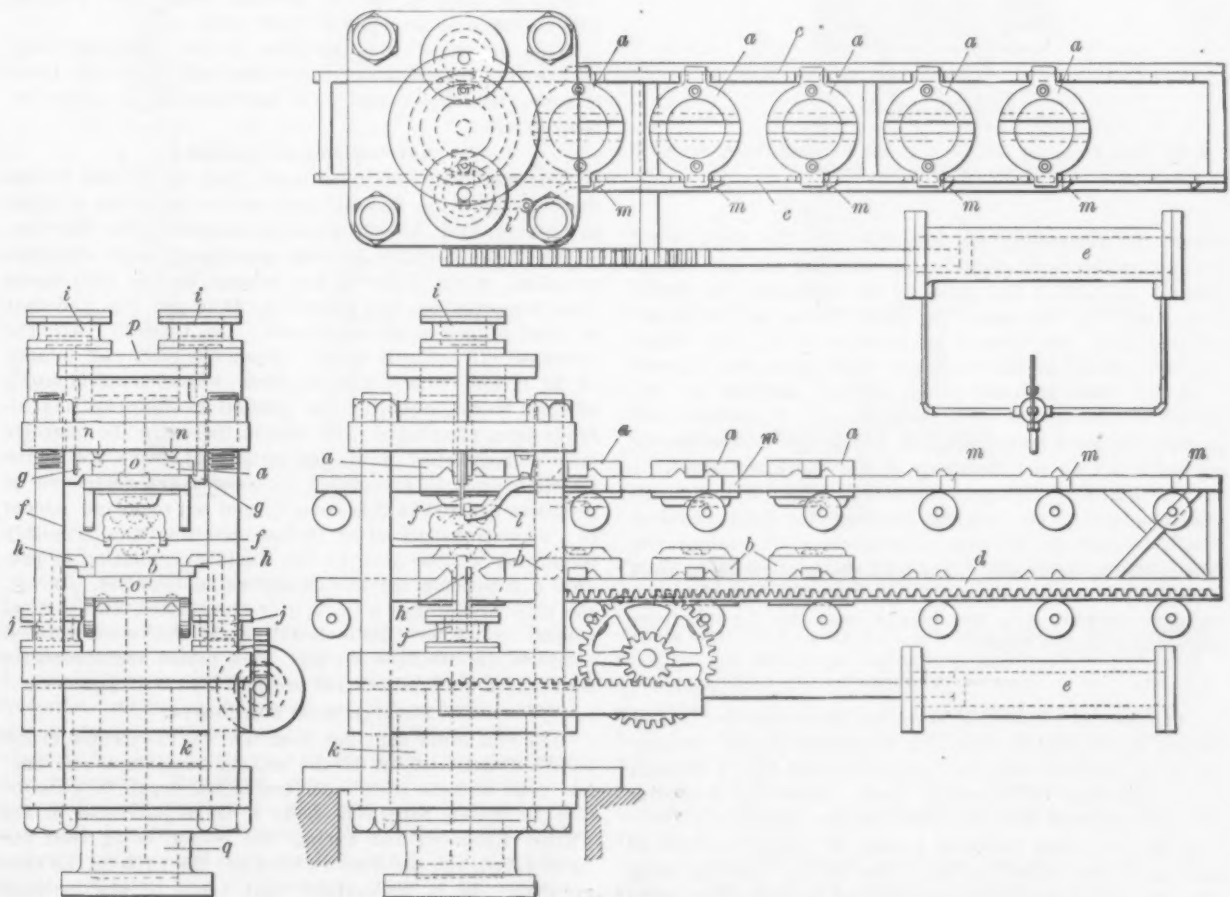


Fig. 5.—Side and End Elevation and Plan of the Baker Car Wheel Forging Press.

of the rim. At this point the operation ordinarily would stop unless a tremendously increased pressure were applied, but at this juncture the inner dies *e e* are with-

power. The blank is automatically taken from one pair of dies, supported while the dies are being changed and then deposited on the next die. The dies *a* and *b* are

supported on the connected racks *c* and *d*, which are moved by the cylinder *e* through another rack and gears, as shown. In the end view of rack and elevation of press in Fig. 5 a blank is shown at rest on two bars *f f*, having been deposited there as the bottom die descended. The dies *a, b*, Fig. 6, are held in place in the press by hooks, *g, g*, and *h, h*, these hooks being operated by cylinders, *i i* and *j j*. The lower platen of the press operated by cylinder, *k*, having descended and the blank being left on the bars *f, f*, the lower outer die is deposited again on the rack and cylinder releases the hook *n*. The upper outer die is similarly released by the cylinder *i* and hook *g*, allowing it to be again placed on the rack. The pressure in cylinder *e* while moving the dies into place is continuous, and at the end of the releasing movement of the hooks *g* and *h* the locking arm *l* is automatically disengaged from lug *m*, and the rack moving forward carries one set of dies out and

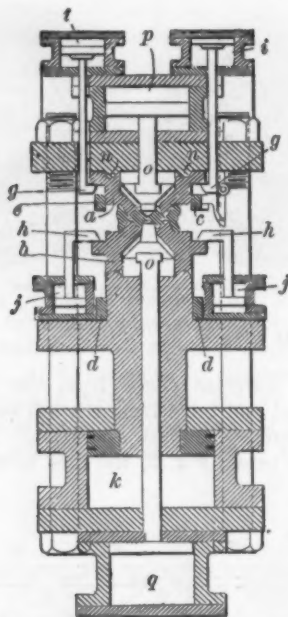


Fig. 6.—End Sectional Elevation of the Forging Press. Showing One Set of Dies in Action.

brings the succeeding set into position, the rack being stopped at the right point by the next lug *m*. The upper dies are then lifted into place by the hooks and the lower dies caught by the ascending press platen and both are registered by the beveled projections *n, n*. The inner dies are carried by the outer dies and engage the T-heads *e* as they come into the press and are operated by cylinders *p* and *q*. By an arrangement of springs and latches the bars supporting the blank are automatically spread apart as the diameter of the blank increases.

The limits of this paper will not allow of taking up questions as to the quality of steel, its final physical condition, details of mill arrangement of rolling the wheel, truing it up, &c. Nor will space allow more than to mention that for lighter forms than car wheels, such as gear blanks, &c., the blanks may be forged from standard hexagon ingots.

The Mexican free zone along the border of the United States, which has been so long recognized by the Governments of the two countries, was abolished July 1 through a proclamation of President Diaz, issued by authority of a law enacted May 24, 1904. At the time of its abolition the free zone included a strip of territory about 20 km. in width, extending from the Gulf of Mexico along the contour of the Rio Grande River and the New Mexico and Arizona frontiers and ending at Tijuilla on the coast of Lower California. The free zone had its beginning in 1851, and at first all goods from foreign countries were imported into it free of duty, but at the time of its abolishment about 11 per cent. of the full Mexican duties were required to be paid.

Industrial Affairs in Canada.

Cobalt Smelting.

TORONTO, September 1, 1905.—A new problem in metallurgy has been raised by the discoveries out of which the new town of Cobalt has grown in the Temiskaming mining district. It may be mentioned again that ores discovered at this point on the Temiskaming & Northern Ontario Railroad are remarkable for their composition. They contain cobalt, silver and nickel, along with other minerals, in an admixture that is seldom met with. Not only are they remarkable for the association of minerals not often found together, but they are even more notable for the richness of their silver and nickel contents. Much has yet to be proved, but the opinion is quite freely expressed that there is no other place in the world where silver averages so large a proportion of the ore. The nickel content is likewise extraordinary. So exceptional is the problem these deposits present that the Provincial Government has at last decided to withdraw from sale or lease the four townships in which the veins are traced. This step is taken preparatory to the devising of a scheme for the better administration of the deposits in the public interest. Influential newspapers maintain that the country might as well be without these rich deposits if the Province is not to derive some revenue from them, for it is pointed out the benefit of their development goes almost wholly to foreigners. In the town of Cobalt a very large proportion of the population is made up of miners and prospectors from fields in other countries, notably the United States. The ores are shipped for treatment to the United States, for there is no suitable refinery in Canada.

It has just been announced that the Canadian Copper Company has completed arrangements to enter the market as a purchaser of the ores. A crusher is being erected. The ore will be roasted in retorts to rid it of the arsenic, which is present in large percentages. Then it will be smelted in the ordinary way. The refining will continue to be done in New York.

This action of the Canadian Copper Company may operate to prevent another development for which there is some demand—namely, the establishing of a Government smelter.

Not Coming to Canada?

The statement has been made that the United States Steel Corporation has decided not to establish a plant in Canada, and the conjecture is hazarded that the vanishing of the bounties has had something to do with this decision. Since June 30 the bounty on pig iron made from imported ore has shrunk to \$1.10 per ton and that on steel billets to the same rate. On June 30, 1907, the bounties will entirely cease. Then the steel rail bounty of \$3 a ton, which was in force when the company's officials were inspecting the ground in Ontario, has already been abandoned. Of course there are the bounties on wire rods, steel plates and structural forms, for which no time limit is prescribed, but these are restricted to products utilized in this country and not exported, except in a state transformed by further manufacture. Possibly something will be done by the Tariff Commission to provide a substitute for the disappearing bounties. If not, the sole advantages a branch of the United States Steel system would have here would be the duties on finished products, the bounties on wire rods, plates and structural forms used in Canada, free ore and free coal and coke.

Foreign Rail Purchases.

The rail order that has been sent by the Grand Trunk to the United States is the second important one that has gone outside since rail production began in Canada. The Canadian Northern made a large purchase in the United Kingdom last spring, the reason being that the home plant was too busy to turn out the rails in the time required. It is understood that some of the railroad companies have represented to the Government that a situation exists in relation to rails the same as that in relation to billets. If because there was an insufficiency of billets the powers to suspend the antidumping duty were exercised, so, it was argued, should the antidumping duty on rails be suspended, because these are not pro-

duced at home in adequate quantities. Such a suspension would make a material difference to rail buyers, for, whereas there are few or no American billets offered in Canada at cut prices, rails can be purchased in the British market at a concession from the regular price. To be sure, delivery from the other side of the Atlantic 2000 miles into the interior of Canada is not so cheap or expeditious as delivery from mills just across the international border.

The Tariff Commission.

The Tariff Commission is holding its first sessions, not on this side of the lakes, but in the West, beginning in Winnipeg. It is complained that it has gone there at an unseasonable moment, just when the farmers are in the thick of the harvest and unable to appear at the hearings. For the West has very decided views on the tariff, and these it is desirous of impressing on the commission-

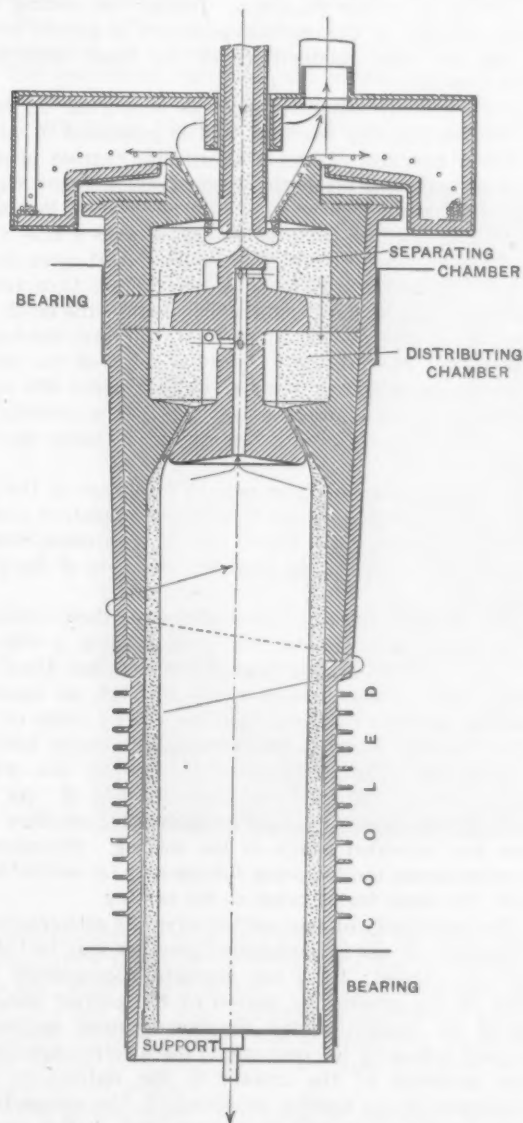


Fig. 1.—Casting Pipe in a Rotary Mold.

ers. There is little protectionist sentiment in Manitoba and the two new provinces, Alberta and Saskatchewan, whose inauguration takes place to-day and on Monday, respectively. At the present time Americans have a strong hold on the expanding trade of the West, and they owe it largely to their alertness and studious care to please their customers. Hardware, steel ranges and agricultural implements and machinery are very largely purchased across the border. Minnesota, Wisconsin and Illinois hardware houses send their goods forward with dispatch, making it a point to rival Winnipeg itself in the promptness of their delivery.

C. A. C. J.

The Baldwin Locomotive Works, Philadelphia, built exactly 1000 locomotives in the first half of this year, and from present indications will exceed that number in the second six months.

Casting Pipe in a Rotary Mold.

BY C. B. STRAVS, MINNEAPOLIS, MINN.

In recent years much attention has been given to the production of castings, special pipes and shafts, directly from molten metals, by a continuous self operating process. The aim is to eliminate the different intermediate steps heretofore required to turn raw material into a finished product.

The object of all processes is primarily the production of homogeneous castings, free from blow holes, slags and other impurities. In most cases this has been partially obtained by mechanical pressure. Some of the disadvantages of operations heretofore used were high temperatures, the abnormally high pressure required and the difficult expulsion of slags, gases also making the employment of mechanical operations exceedingly difficult, if not impractical.

Centrifugal Force.

Many attempts have been made to utilize centrifugal force for this purpose, and one of the first experiments in this line dates as far back as 1857. However, the experiments were incomplete, as their aim was only the expulsion of gases from liquid metals.

In a paper printed in *The Iron Age* January 14, 1904, N. Lillenberg gave a very interesting explanation before the Philadelphia Foundrymen's Association of making steel castings from a rotary mold and how to meet the obstacles encountered in the superheated metal. The chief obstacle of such devices, to his mind, was that the

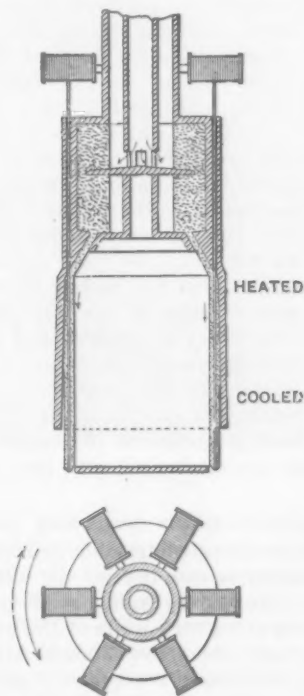


Fig. 2.—Section and Plan of Mold Used in Reinforcing Pipe Castings with Wire or Wire Fabric.

metals could not be kept liquid long enough for pouring, rotating and removing the hollow ingots from the mold.

Before the publication of that paper I had already succeeded in producing by centrifugal force pipes and hollow ingots from molten metal by a process which I will describe in which the material was poured, cleaned, formed and removed as fast as required in one continuous operation. The results obtained by the process are the following:

1. A continuous self regulating stream of metal supplied to the mold and protected from oxidation.
2. The removal of gases and slags before the beginning of the formation and solidification of the casting.
3. An unvarying, steady and undisturbed inflow under pressure of the molten metal into the formative mold.
4. The free shrinkage of the casting and complete escape of all the gases.

5. The perfect control of the solidification of the metal, insuring sound castings.
6. Precise regulation of the thickness of the walls of the product.
7. Perfectly smooth inner and outer surface of the casting.
8. The ability to produce any desired length of casting.
9. The reinforcement of the casting by the insertion of continuous wires or wire fabrics.
10. The adaptation of the process to all kinds of metals.

Description of the Process.

These results have been obtained by directly feeding the molten metal centrally into a preliminary separating chamber attached to the rotating mold, as shown in Fig. 1. There the slag is completely separated from the metal by centrifugal action and driven off as it accumulates, through a central conical discharge surrounding the intake. The major portions of the gases follow the slags into a stationary surrounding mantle. This discharge also serves as an overflow and safety outlet for any incidental overfeed that may occur.

The central intake pipe is partially immersed in an accumulated layer of slag, through which the metal passes to the outer wall of the separating chamber. By this arrangement the inflowing metal is protected from contact with the air and danger of oxidation.

From the upper separating chamber the purified metal passes through an annular gateway of larger diameter into a lower distributing chamber, during which passage it attains the speed of a formative mold, and from which it passes downward and outward, under centrifugal pressure, in a steady, uniform stream, through a conical gate into the upper formative part of the mold. A partially refractory support is here provided, rotating with the mold and located immediately underneath the gate when the casting is begun. To this support the molten metal fuses itself, and as the casting proceeds the support is gradually lowered until it enters the lower cooling section of the mold. This section consists of a series of ribs, or rings, cooled by water circulation, gradually reducing the heat downward as the cooling water entering at the bottom circulates around the mold and is discharged at the top. By this means the cooling of the metal is gradual and uniform, with no danger of cracking in the shrinking.

The gases formed in the process of cooling freely escape through a central aperture provided in the center core and leading upward to the separating chamber, from which they are discharged with the slags and other impurities.

As the support is slowly descending the cooling proceeds, and the resulting contraction and solidification of the metal gradually release it from the wall of the mold. The centrifugal force of the rapidly rotating molten metal against the inner refractory walls of the mold causes the metal to form in an even, tense annular layer around the wall, entirely free from flaws and imperfections. As the process of cooling proceeds from the outside a crust is formed, gradually increasing toward the center in thickness and strength, resisting and neutralizing the centrifugal force against the walls of the mold, until the centrifugal force and the centripetal force, due to contraction, balance each other, the latter overcoming the former, until the now set pipe is entirely released from the walls of the mold. The feed of the molten metal into the mold being a known constant equation, the thickness of the pipe formed depends upon the downward movement of the metal through the mold. This is regulated to certain velocities for different sizes and thicknesses of pipes, ascertained by experiments, and acting by a system of interchangeable gearing upon the pipe support.

For metals having a high fusion point, like steel, iron, copper, &c., the annular feed gate leading from the distributing chamber into the mold proper, as well as the mold and auxiliary chambers, is lined with refractory material to avoid wear and insure a constant uniform flow of the metal.

Experiments have proved siloxicon to make the best material as a refractory lining. It resists temperatures up to 5000 degrees F., is proof against molten metal, acid or basic slags and is susceptible to a suitable polish for the interior wall of the mold.

Pipe Cut to Length.

When the pipe has reached the desired length a vertically moving rotating clutch grips the descending pipe, and an automatic cut off saw cuts the pipe, after which the finished pipe length is removed, and the clutch and cut off saw automatically ascend to cut the following pipe. The fusible pipe support is used only in casting the first pipe length, from which it is later cut off. The metal is poured from a ladle of the ordinary type provided with a regulating valve. Before starting the pouring the mold and auxiliary chambers are thoroughly heated by applying the flame of a fuel oil furnace to the inner refractory lining of the chambers. During the casting the heat is retained by the continuous supply of molten metal and the low heat conductivity of the inner refractory lining material.

The vertically mounted mold is supported on suitable antifriction step bearings and is journaled in upper and lower bearings of ample dimensions carried upon a frame of sufficient strength to positively prevent vibrations of the mold even when casting the largest ingots or pipes. The rotating parts being adjusted to a true running balance when empty, the molten metal upon pouring will, by centrifugal force, arrange itself in a tense, even layer against the circular inner wall of the mold, resulting in a pipe casting of perfectly uniform thickness throughout. The necessary rotative speed of the metal when forming we have found to be only about 600 revolutions per minute for a 6-inch pipe, or a velocity of about 900 feet per minute for metals of mean specific gravity.

The linear movement, or rate of discharge of the finished pipe castings, is about $\frac{3}{4}$ inch per second, or nearly 3 feet per minute, for a 6-inch pipe $\frac{1}{2}$ inch thick, and is regulated according to the size and thickness of the pipe to be cast.

The reinforcement of the castings, as above referred to, is accomplished by automatically feeding a wire or wire fabric of a slightly higher fusion point than the casting from spools located above through an annular space surrounding the mold into the molten metal of the casting proper, where, after passing the upper part of the forming mold, it enters the metal at the water cooled part of the mold, as shown in Fig. 2. As the metal in its downward course gradually solidifies the wires are imbedded firmly in the casting. By entering the wires at the cooling point fabrics may be used of very nearly the same fusing point as the casting.

The superiority of this method over the attempts heretofore made by use of mechanical pressure may be briefly stated to consist: 1, In the absolute homogeneity and purity of the product by reason of the perfect elimination of all impurities and the homogeneous molecular grouping caused by the centrifugal force acting equally on every molecule of the metal; 2, the uniformity and smoothness of the casting produced; 3, the compactness of the needed plant and appliances, and, 4, the greatly reduced cost of manufacture.

The abolition of the export duty on Spanish iron ore is sought by the German Government, and is one of the chief objects, from the German standpoint, of the proposed new treaty with Spain. The imports of iron ore from Spain into Germany amounted to 1,918,000 tons in 1902, 2,491,000 tons in 1903, and 3,003,000 tons in 1904, but it is considered that the actual tonnage was greater, as considerable Spanish ore was procured through Belgium and Holland. The present commercial treaty between Germany and Spain expires in June, 1906. At times a high countervailing import duty on Spanish iron ore has been proposed in Germany, but the suggestion has never been carried into effect, owing to the burden that would thereby be imposed on the German iron industry.

Charles A. Schieren & Co.'s New Belt Factory.

A modern belting factory and office building has recently been completed by Charles A. Schieren & Co. in New York City. The Schieren Building, as it is known, is located in the heart of what is still called the "Swamp" and for many years has been recognized as the center of the leather district. It is a ten-story fire proof building, occupying a site 84 x 124 feet, at the corner of Cliff and Ferry streets. The building is equipped with three large electric freight elevators and one high speed electric passenger elevator, is provided with a sprinkler system for fire protection and has its own plant for power, light and heating. The basement, first floor, part of the fourth and all of the fifth and sixth floors are occupied by the Schieren Company and the remainder is leased to other tenants. The first floor contains the office and shipping room, and the factory proper takes up the balance of the space mentioned.

The convenient handling of product was a problem that has been very satisfactorily solved. The receiving and shipping of goods was complicated by the narrow

feet high, and hold about 8 tons of ground bark. The bark is moistened as it is fed into the tubs by a spray of water from rotating brass sprinklers, and the water filters through the mass, carrying with it the tannic acid. The liquid is collected in a false bottom in the leaching tub and is pumped to a storage tank, from which it is drawn as needed to the handling vats. The hides are packed closely in these vats and are left for 10 or 12 days. The bellies and heads are then trimmed off to be tanned separately for use in shoe manufacture. The butt parts, those used for belting, are then stowed in vats, being placed about a hundred in a vat, with layers of loose bark between, and are covered with strong tanning liquor. They are given five treatments, the first lasting about 10 days and the last 40 days, so that for the best oak tanned belt leather about 120 days are required for the treatment. Finally the hides are washed to remove the tanbark, are oiled on the grain side and are hung up to dry in a darkened loft, where they are kept at an even temperature and gradually assume a russet color, which indicates they have attained their best condition.

In this shape most of the hides are shipped to the factory in New York, although some are carried through

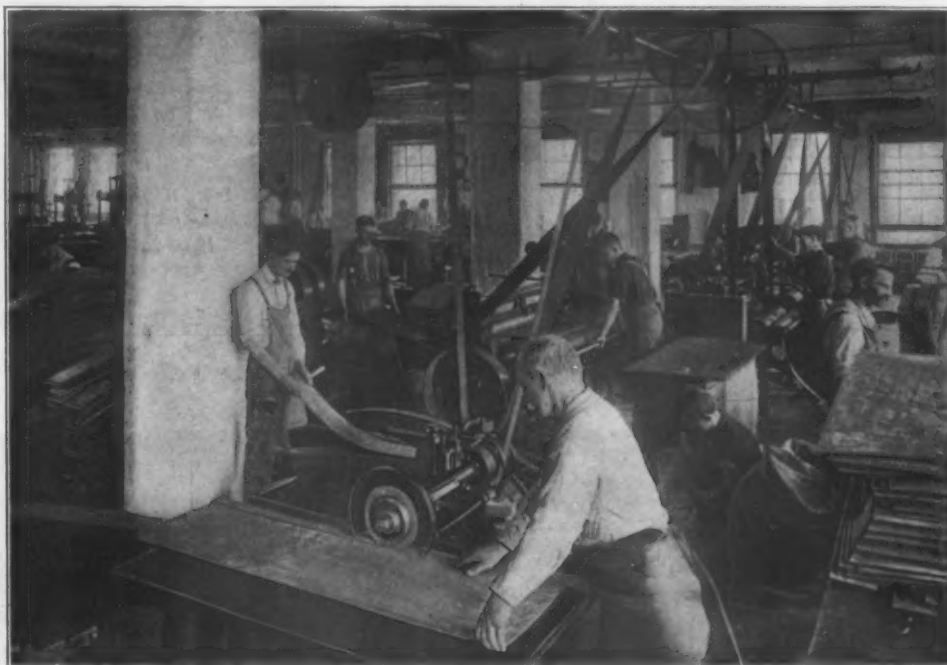


Fig. 1.—A View on the Sixth Floor, Showing the Cutting and Searing Machines.

streets that characterize this section of the city, and it is imperative that they be blocked by teams as little as possible. Rapid loading and unloading of trucks have been provided for. Raw material is discharged into the basement through a chute, and the shipping department being on the first floor but little time is taken in the dispatching of goods.

Much of the leather is already in condition to be immediately converted into belting when received from the company's Dixie Tannery, at Bristol, Tenn. This tannery has a capacity of about 100,000 heavy belting hides a year and is admirably located in the vicinity of an abundant source of rock oak bark that is considered the best for tanning belt leather. Here the hides are received from the slaughter houses of Chicago and Kansas City. Briefly, the process of their preparation is as follows: They are first soaked in water to thoroughly wash out all dirt, after which they are placed in a vat of weak lime water. The strength of the bath is gradually increased until the sixth day, when the hair has become sufficiently loosened to allow it to be scraped off with a blunt knife while the skin is laid on a beam. The bare hides are then placed in an alkaline solution called the "bate," which removes the lime that may have remained from the previous bath. The tanning process then begins in a weak bath of tanning liquor. The latter is made in leach tubs, which are 12 feet in diameter by 8

further processes and are received in strips ready for making up into belts. This work as done at the factory first involves soaking and scouring. The hides are put in a large revolving tub filled with water and are soaked until they are soft and pliable. They are then laid one at a time flesh side up on a large table movable in all directions in a horizontal plane, so that all parts may be brought into contact with the reciprocating rollers on the scouring machine. A spray of water plays on the hide at the same time and the rollers squeeze out the water and with it the dirt, which is carried away with the water as it drains off. The hide is then laid over a beam, the flesh side scraped and the parts unsuitable for belting are trimmed off. The grain side is then oiled and the flesh side put through a process called stuffing, which consists of thoroughly rubbing into the pores a quantity of cod oil or pure beef tallow to preserve the leather and improve its ability to transmit power. After stuffing the hide stands for two days to absorb as much of the dressing as possible, and it is then smoothed and stretched so that the fibers may be made uniform. The stretched butts are allowed to dry for about two weeks and are carried up to the sixth floor, where the belt manufacturing begins.

The first step is to cut the large squares of leather into strips a little wider than the finished width of the

required belt. Fig. 1 shows a view on this floor and in the foreground may be seen one of the cutting machines. These somewhat resemble buzz saws, except that instead of a saw a rotary knife is used running at high speed. The stock is guided by adjustable guides and is transformed into strips with great rapidity. If the belt is to be 8 inches wide or more only the center part of the hide is used, this being cut symmetrically with the part

windows. A large and a small scarfing machine may be seen in Fig. 1 just beyond the cutting machine.

Fig. 2 shows a line of the presses used in making the joints and Fig. 3 two of the largest presses for taking very wide belts. On one side of the presses are long tables, where the scarfs receive a last scraping to give a smooth, even lap. Both parts of the joint are smeared with a special cement made by the company for the pur-



Fig. 2.—The Hydraulic Presses Under Which the Laps Are Placed After Cementing.

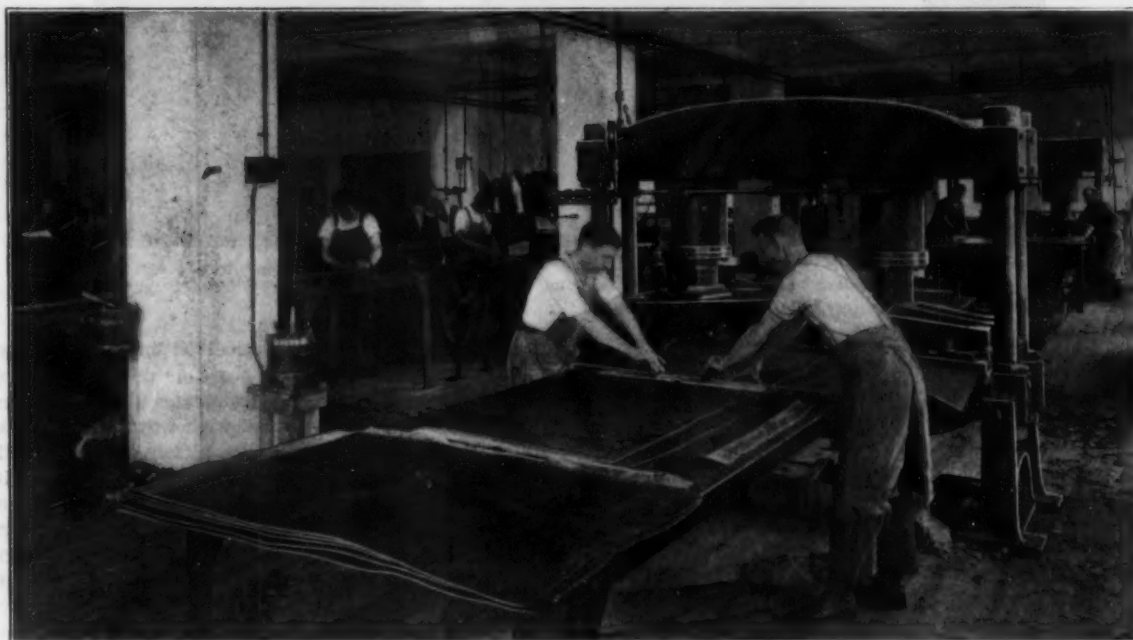


Fig. 3.—Another View in the Same Department, Showing the Largest Presses.

that covered the backbone, so that the strength is evenly divided between the two sides. For narrower belts the difference between the two edges is so small that it is not necessary to use only the center. The short continuous strips are next passed through scarfing machines, which thin down the ends for the lap joints. The rough scarfing made by the machine is finished by hand with a very sharp tool that must be frequently resharpened. This work is done at benches disposed along the sides of the room, where the workmen have ample light from the

pose and are pressed together by hand and lightly rubbed down. The cement pots are electrically heated, keeping the material constantly at the proper consistency. The joint is next put under the ram of the hydraulic press and pressure applied of varying amount according to the width of the belt. This joint remains under pressure until the next is prepared, and so the continuous belt issues from the opposite side of the press and is coiled on a reel. If narrow belts are being joined two or even three are carried through the presses simultaneously.

The hydraulic presses and the pumps and accumulators for operating them were furnished by the Watson-



Fig. 4.—The Pump and Accumulator Equipment.



Fig. 5.—The Trimming, Stamping and Winding Machines and the Finishing Machines.

Stillman Company, New York. The pumping and intensifying equipment is shown in Fig. 4. This includes two four-plunger belt and two hydro-pneumatic intensifiers or accumulators. The four pump chambers in each pump are connected to one common delivery pipe. The arrangement is such that the raising of a weighted double lever, which may be seen on the nearest pump, will prevent the next revolution of the pump from making further delivery by by-passing the water to the supply tank. Each pump is driven by a 5 horse-power Westinghouse motor at about 80 revolutions per minute. The pumps deliver water to the accumulators. Each accumulator contains a cylinder having a piston head 24 inches in diameter, which is under an air pressure of about 200 pounds per square inch delivered through a receiver tank by a belt driven air pump, also connected to a 5 horse-power Westinghouse motor. A hollow piston rod connected with this head is the cylinder of the hydraulic accumulator. It has a plunger $4\frac{1}{2}$ inches in diameter with a stroke of 27 inches. The pumps deliver water until the ram on the upward stroke cuts off the delivery. It is only necessary to run the air pump in the first starting. The pressure being once obtained is maintained almost constant, varying only about 5 per cent. with the forcing back of the volume of air in the cylinder.

The equipment of presses comprises one capable of taking a belt 84 inches wide, shown in Fig. 3; one taking

up to 72 inches, which may be seen behind the first in the same engraving; six presses for 30-inch belts, two for 24-inch, two for 18-inch and a large number of presses for 12-inch and narrower sizes of belts. The two larger presses have two cylinders so arranged that there is an even distribution of pressure over the entire surface of the belt. The bed of the press, over which the belt passes, is stationary and does not break the lay of the lap by pulling of the belt in raising. The reverse or upward motion of the platen is accomplished by two small cylinders placed between the two end rods. One motion of the valve lever sends the water to either the upper or lower cylinder, as desired. The gauge which shows the pressure is arranged to indicate directly the pressure corresponding to the width of the belt in inches. The 30-inch presses are also of two-cylinder type. The platen is raised by two small cylinders directly beneath the larger ones. These are kept under pressure at all times, so that the platen is prevented from descending faster than the pump drives it. All motions of the press are governed by one double valve. The 24, 18 and 12 inch presses have only one cylinder and differ slightly in construction. The 24-inch presses, which may be seen in the foreground in Fig. 2, have a massive upper member for the support of the cylinder. The moving platen and ram are counterbalanced by a small cylinder mounted on top of the

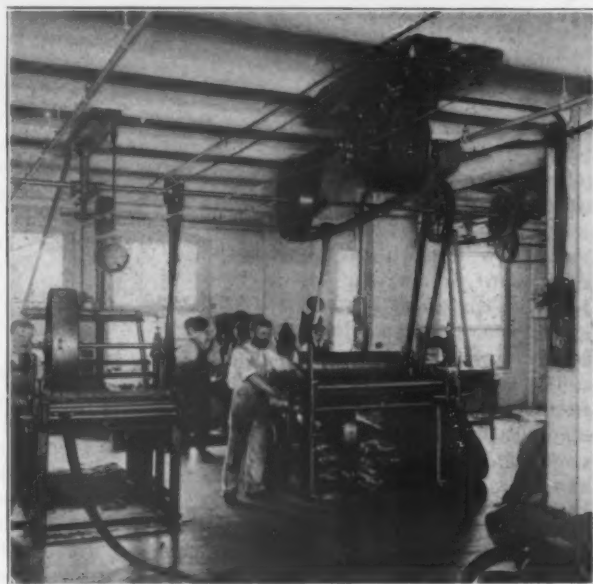


Fig. 6.—Opposite View of the Trimming and Winding Machines.

press. In the smaller presses the lifting cylinders are omitted, these being replaced by heavy springs at the

sides between the main press rods. The tables for the presses were furnished by the Charles Holmes Machine Company, Boston, Mass.

After the work of cutting the leather into strips and cementing them together into continuous lengths the process continues on the floor below. Two views of this floor are shown in Figs. 5 and 6. The belts are put into machines shown at the right and center of Fig. 5 and from the opposite standpoint in Fig. 6. The belts are introduced at the sides shown in Fig. 6 and are passed between rollers, which sufficiently retard the belt to put some tension on it as it is coiled on the opposite end of the machine. Just above the rolls where the belt is admitted are placed two stationary knives, adjustable in their distance from one another, which trim the belt to width, giving it a slightly rounded finished edge. The wheel shown above the machine at the left in Fig. 6 and the one below the center of the larger machine roll with the belt and carry dies which stamp the trademark once every ten feet and consecutively number the length by feet, so that the finished belt is marked and measured as it is coiled on the drum, as shown in the view in Fig. 5. The coils as taken from the winding machines are tacked to prevent uncoiling and are placed on the machine at the extreme left of Fig. 5. This machine has a rotating table upon which the belt is loosely laid. The edges are treated with a varnish and are polished by revolving beneath a stationary adjustable brush. The belts as taken from this machine are finished ready for the market unless other than the ordinary cemented joint belt is required. There are frequently calls for belting of special specifications, such as those in which the joints must be riveted as well as cemented. This is more often required in two and three ply belts than in those of single ply. Benches where this riveting is done are located along one side wall near the windows. Much of this riveting is done by hand, but there is also a small machine which does the work automatically on comparatively narrow belts. Another machine in this room is a sewing machine for stitching with linen thread the edges of two-ply belts. Such work is sometimes required by foreign customers. The company has a special way of fastening the edges of belts, which it particularly recommends as better than any continuous form of stitching, either with wire or thread. This consists in fastening the plies with copper wire screws placed an inch or less apart. It has the advantage of in no way decreasing the flexibility of the belt. A wire stitched belt is open to the objection that the continuous bending is likely to break the wire, allowing the plies to loosen if the cement fails to hold. There is no special need of fastenings of any sort in belt other than that intended to run in damp places. For inserting these wire screws a machine is used which runs at very high speed, forcing the end of a long continuous screw into the belt and cutting it off. The belt is fed automatically between the insertion of each screw and the work is accomplished with great rapidity.

The remainder of the space on this floor at present is given up to 11 presses used for making belt joints. This department is simply a reserve to be used in case of any disability of the hydraulic presses on the floor above. In another corner are located two large tanks through which belts are passed that are given special treatment. In one the belt is rendered weather proof by being coated with a solution known as "leatherene," and in the other the belts are treated with a tallow coating.

The fourth floor is devoted to special work, including everything outside of flat belt manufacture. Here are made leather link belts, round belts, twisted leather belts, raw hide rope, raw hide lacings and raw hide cords for car bells and similar uses. The leather link belting is rather interesting in its manufacture. The first process consists of stamping the links, for which there are a number of power presses. The link belts are assembled on benches, being laid edgewise, while successive courses of links are threaded upon the rivets. A special form of link belting is made with alternate lines of brass links. These are cut somewhat smaller than the leather links so that they do not come in contact with the surface of the pulleys, and the belt has all the adhering power

of the leather. The advantage of the brass links is that they eliminate stretching of the belt.

Round leather belting is made in long continuous strips by cutting the leather spirally from a large circular disk. The work is done by hand with a knife provided with a guide which preserves an even width of the cut strip. In the condition as first cut the thong is square in cross section and it is made round by drawing through dies. Round belts of a diameter greater than the thickness of a hide are made in two-ply form, being riveted together with the copper wire screws before referred to, or are made in twisted form. The bell cords are cut from raw hide skins in much the same manner as the round belting, but are left in rectangular cross section.

The present firm of Charles A. Schieren & Co. was founded in 1868, and in 1882 Jacob R. Stein became a partner; the latter retired in 1887, and in 1888 F. A. M. Barrell was admitted. Chas. A. Schieren, Jr., has been connected with the company since 1890 and was admitted to partnership in 1897. The company has branch offices in Chicago, Philadelphia, Boston, Pittsburgh, Denver, and Hamburg, Germany. In addition to this plant and the Dixie Tannery, at Bristol, Tenn., which was mentioned in the early part of the article, the company owns a lace leather tannery in Brooklyn, where some 60,000 sides of lace leather are tanned annually.

The Production of Antimony in 1904.

Several obstacles combine to prevent the profitable exploitation of antimony ores in this country. These obstacles are set forth by Dr. Edmund Otis Hovey in a report made for the United States Geological Survey on the production of antimony in 1904. In the first place, the reduction of antimony from its ores and its alloys with other metals is a difficult, complex and expensive process, and successful smelting depends upon peculiar conditions. Foreign ores are abundant and cheap. The price of the metal is comparatively low. It is apparent therefore that domestic ores do not repay the cost of transportation, and it is not surprising that the production of metallic antimony in the United States from domestic ore during 1904 was practically nothing. Only 25,000 pounds, valued at \$396, were reported. Small as was this production, however, it is an advance over the returns of 1902 and 1903, when absolutely no domestic ores were reported.

The estimated consumption of antimony in the United States in 1904 was 4750 net tons, of which 2571 tons, or more than half, was derived from hard lead and 481 tons from imported ores and crude antimony, domestic ores and imported metal supplying the remainder. The imported ores are estimated to contain an average of 52½ per cent. of antimony and to yield 42 per cent. of refined metal by smelting operations. Crude antimony, which is a refined or concentrated ore and not metal, is included in the quantity of ore imported.

The average annual world's production of antimony is about 8700 net tons, having a value of approximately \$900,000. Germany heads the list with 3858 tons and is followed by France with 1901 tons, Italy with 1202 tons, Hungary with 753 tons and the United States with 657 tons, the balance being scattered between Servia, Austria, Japan, &c.

Although the United States has practically no output of metallic antimony from domestic ores, a large quantity of hard lead or antimonial lead is produced here in the process of smelting impure silver lead ores. In 1904 the production of this alloy was approximately 21,752,000 pounds, with an antimony content ranging from 23.13 to 32 per cent., and amounting to about 5,142,000 pounds. Hard lead is used in the manufacture of the several alloys of antimony. Its price ranges about 20 cents per 100 pounds less than that of soft lead. The total amount of metallic antimony obtained from domestic and foreign ores and from hard lead was 3057 short tons in 1904, valued at \$505,524.

During 1904 the quantity of antimony ore imported into the United States and entered for consumption was 2,288,518 pounds, valued at \$50,414, whereas in 1903 the

quantity was 2,714,617 pounds, valued at \$54,316, a decrease in quantity, but a slight increase in the average price per pound.

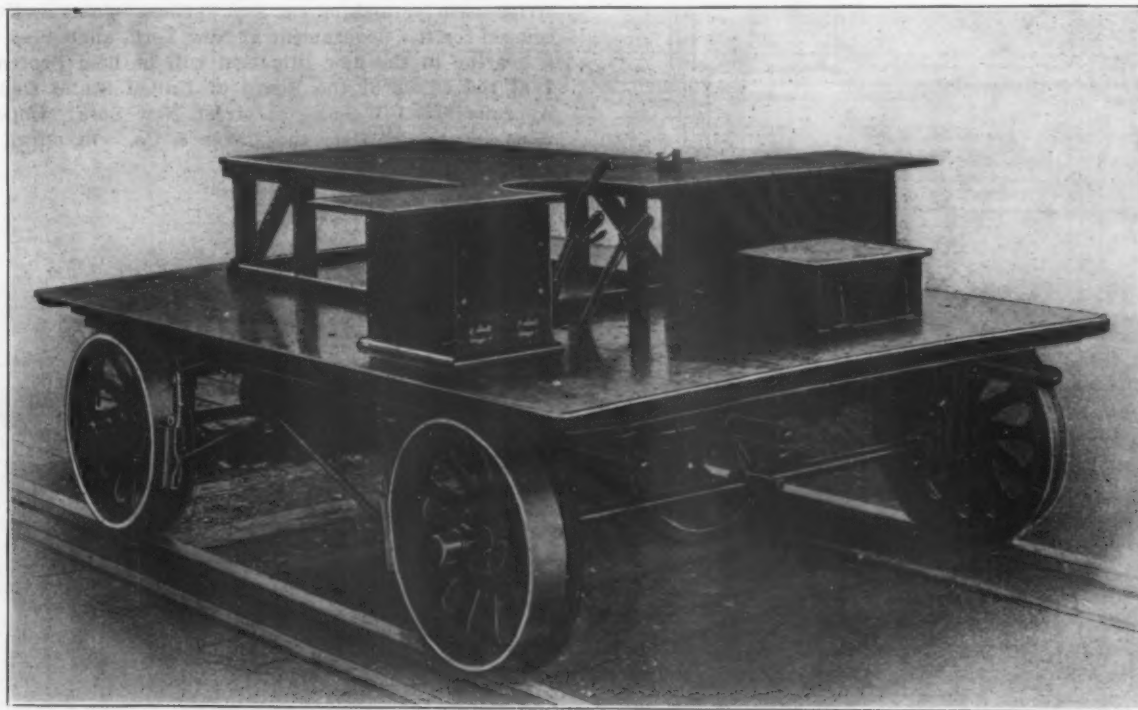
Antimony fuses at a low temperature and readily vaporizes. It is not used in the pure state, but it forms several valuable alloys and compounds. The most important alloys of antimony are type metal, britannia, pewter and antifriction metals. Type metal consists, essentially, of lead and antimony, often with the addition of small quantities of tin and nickel or copper. Britannia is a white metal alloy of antimony with tin, copper and bismuth and is much used for table ware. Pewter is a similar alloy, but it contains a smaller percentage of antimony than britannia. There are several antifriction alloys which usually go under the name of babbitt metals. The addition of antimony to lead hardens it, and the addition of a small quantity of bismuth gives the alloy the property of expanding at the moment of solidification from a molten state, thus producing a perfect cast from a mold.

Gasoline Motor Work Car for Railroads.

A new type of section gang work car for railroad use, driven by gasoline motor, has recently been exhibited in Chicago and has proved of interest to a number of operating officials. It is particularly adapted to carrying

Mich., and its sale is in the hands of the Railway Appliances Company, Old Colony Building, Chicago, Ill.

Varying Results with Concrete Ties.—There has been a further discussion recently in the railroad journals of the results of the use of concrete ties. The experience of the Pennsylvania lines west of Pittsburgh has not been satisfactory. A lot of 30 reinforced concrete ties put in six years ago were removed after a year, largely because of the weakness of the fastening between tie and rail. Three years later another design of reinforced concrete ties was used, and of 21 ties put into the track in the winter all were removed within a month because the concrete broke away from the reinforcing metal. Other ties of this second design were used from time to time. By the middle of the summer of 1902 about half of a total of 300 had been removed, and by fall two lots of 100 each had been added. By the spring of 1905 only about 100 of the 500 ties were left, and most of these were reported imperfect. All these ties were subjected to heavy traffic. Others of the same design laid where traffic was lighter gave slightly better results, though many of them were broken within a year's time. The experience of the Lake Shore Railroad with ties of the same design as used on the Pennsylvania line was more satisfactory, as noted in *The Iron Age* of August 24, page 481. Engineer Rockwell made a favorable report on the whole.



Gasoline Motor Work Car for Railroads.

a considerable number of men for section and special work and to handling tools, rails and other material. Ten men can be carried upon a car of the type shown in the illustration. The power equipment consists of a two-cylinder 8 horse-power gasoline engine mounted on a frame constructed of steel tubing, which gives strength with a minimum of weight and insures freedom from vibration as well as durability in service. The transmission is so arranged as to give the same speed forward and back; thus the car can be operated with equal facility in either direction without being turned. Another feature is the substitution of air cooling for the ordinary water cooling system, and the car is thus equally serviceable in winter and summer. Double hub brakes are provided so that the car can be brought quickly under control at any time. The gasoline engine and the propelling machinery are designed to be built for any gauge from 24 inches upward. One of the aims of the manufacturer has been to produce a car which can be safely and successfully operated by one unskilled in the use of gasoline motors, the control being simple and easily handled.

The car is built by the Olds Motor Works, Detroit,

He attributed the failures in part to poor concrete and in part to the jar of fast moving trains. *The Railroad Gazette*, in commenting on the subject, calls attention to the fact that on the Pennsylvania lines the track remained in good condition as to line and surface with little labor where concrete ties were laid on divisions having lighter traffic. It further emphasizes the opinion of Engineer Rockwell of the Lake Shore that there is a large field for concrete ties, but they should not be laid in fast tracks, as the material is not suited for continuous heavy shocks. The distinction is also noted between steel concrete ties and concrete steel ties. In the former the steel takes the load and vibration, jarring the concrete loose, with resultant failure.

The expansion of concrete in sidewalks in Mankato, Minn., has caused some difficulty, and expansion joints of asphalt have been placed in the walks to prevent them from being thrown out of line and also to prevent the breaking of curbs at street corners. The joints have a width of 1 to 4 inches, and the city engineer expects them to relieve the difficulty encountered.

A 3000-Ton Hydraulic Slab Shear with Special Feeding Device.

A 3000-ton hydraulic slab shear with accessories was recently designed by the Bethlehem Steel Company, South Bethlehem, Pa., to serve a 32-inch blooming and slabbing mill. It included the shear, pumps, accumulator and pusher with the valves, governor, high pressure piping, &c. All parts were designed for high grade material and to sustain safely all strains that can be put upon them. The design is such that working parts are easily reached and all plungers are supplied with outside packing.

The shear, Fig. 1, can handle a slab 56 inches wide by 24 inches thick and works with a pressure of 6000

two horizontal and one vertical cylinders. The horizontal cylinders have plungers fixed at opposite ends, and as the pressure water is admitted to one or the other the cylinders move to or away from the shear. A stirrup iron connects the plunger of the vertical cylinder with the arm at about its central point and lifts the ends of the arms clear of the table and billet when not in use. This arrangement of cylinders dispenses with all inside packing of plungers. Two arms, whose ends overlap in reach, are provided, so that comparatively long billets may be handled without the aid of the table.

The pusher is mounted on eight wheels, which move on two I beams, supported by the gag cylinder and cross beams over two columns which straddle the table. The operating valve is placed alongside that of the shear to be worked in connection with it. The accumulators are of the standard Bethlehem type. The pressure water is supplied by a pair of 28 x 3½ x 24 inch duplex steam pumps, which are controlled by an automatic hydraulic governor.

Customs Matters.

The Steel Strip Duty.

Representatives of the Treasury Department have completed arrangements for another test case to determine whether or not extra duty may be levied under the terms of the Dingley Tariff law on importations of steel strips used for making car seat springs. John A. Kemp, counsel for the Government at New York, announces that a hearing in the new litigation will be held September 7 at the offices of the Board of United States General Appraisers, 641 Washington street, New York. Importations entered by Hermann Boker & Co. will afford the

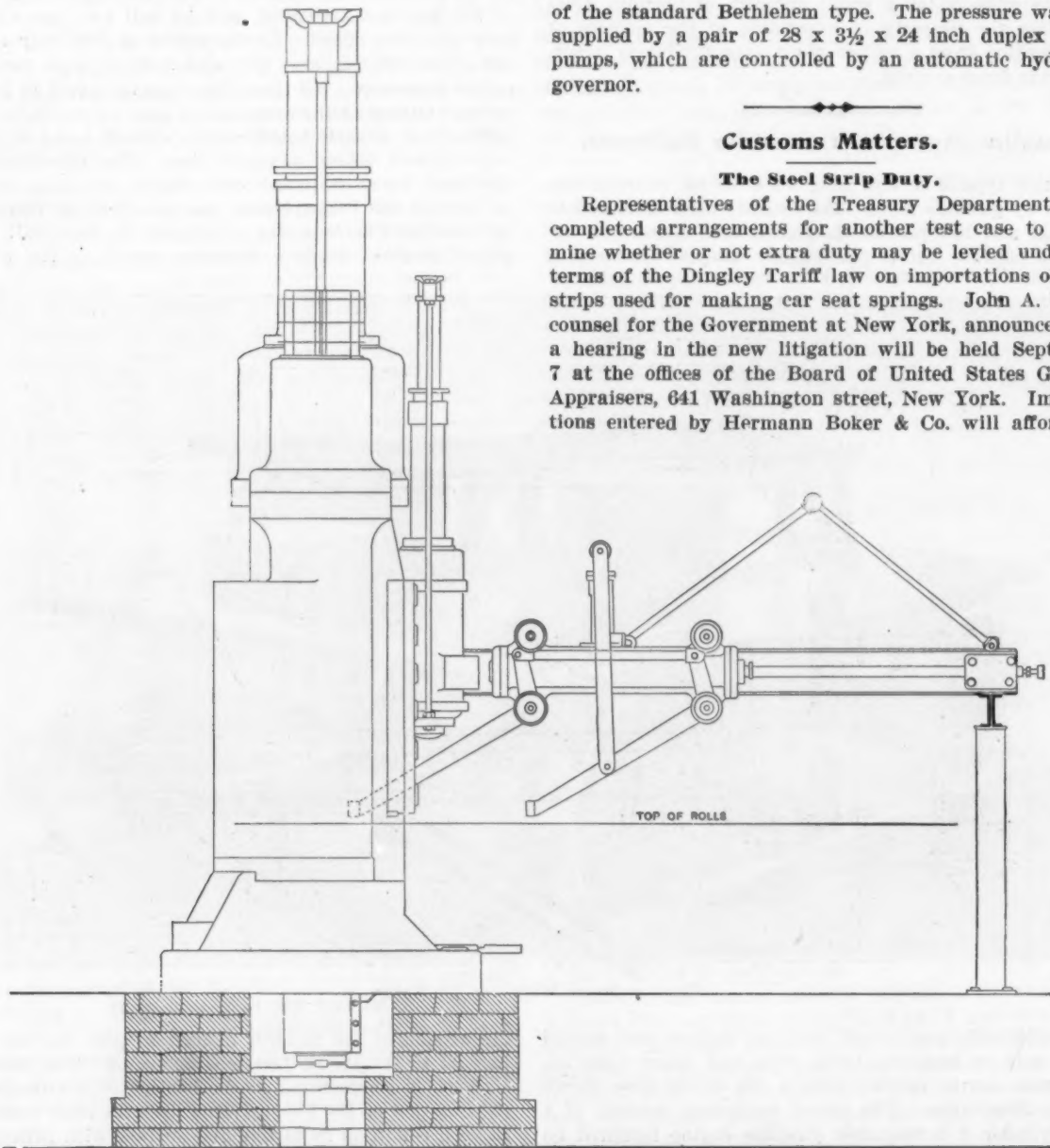


Fig. 1.—Side Elevation of 3000-Ton Hydraulic Slab Shear with Billet Pushing Device.

pounds per square inch. The pullback plunger is placed directly over the main plunger and uses 400 pounds pressure, which is supplied by an accumulator. The base plate is protected by a steel wearing plate which covers the entire upper surface. The columns are of forged steel 16 inches in diameter. An independent gag plunger is provided for holding the slab.

The pusher, which is a patented device, shown in detail in Fig. 2, consists of a combination of levers and arms controlled by horizontal and vertical cylinders in such a manner that short billets and ends may be pushed under the shear. The piece which comes in contact with the billet is protected by a steel shoe and forms the end of a long arm, which is hung to a casting consisting of

basis for the Treasury's latest attempt to assess an extra duty on the strips. The Crucible Steel Company and others have protests pending with the customs court. Both sides will put witnesses on the stand in support of their respective contentions. The merchandise was assessed for duty at the rate of 12-10 cents per pound, in addition to which the collector of customs exacted an additional duty of 1 cent per pound on the ground that the strips had a perfected surface finish or polish better than the grade specified in the paragraph under which the regular classification was made. Notwithstanding that the Government suffered defeat in a former attempt to collect the extra duty, the Secretary of the Treasury has steadfastly insisted that with adequate evidence the

courts will eventually sustain the legality of the additional assessment. Although the Crucible Steel Company was uniformly successful in its contention before the Board of Appraisers and the Federal courts that additional duty on steel strips is illegal, Secretary Shaw remains undismayed. The Board of Appraisers is expected to formulate a decision in the Boker case next month.

Duty on Small Metal Wares.

The Board of United States General Appraisers last week rendered decisions classifying steel fob chains, metal dress ornaments and steel chatelaine bags. In the protest case of William Wetstein, New York, the customs tribunal holds that steel fob chains must pay duty as jewelry at the rate of 60 per cent. The importer's claim for assessment under the provision for manufactures of metals, with duty at the rate of 45 per cent., is denied.

In a decision by Judge Somerville the board sustains a protest filed by Samstag & Hilder Brothers, New York, it being found that fancy metal buttons other than trouser or nickel bar buttons are dutiable at the rate of $\frac{3}{4}$ cent per line gross and, in addition thereto, 15 per

Company of Sault Ste. Marie, Ont., which bid on the business and was prepared to make the deliveries required.

The New York "Anti-Tip" Act.

The text of the so-called "Anti-Tip" act, passed at the last session of the New York Legislature and which went into effect on the 1st inst., is given below. While it is directed against the practice of corrupting purchasing agents, whether they be the maid servant to whom the grocer gives a bonus in return for her mistress' trade or the agent of a commercial house whose patronage may mean thousands of dollars a year to the manufacturer who gets it, the first paragraph would seem comprehensive enough to cover almost any kind of a tip:

An act to amend the Penal Code, prohibiting the corrupt influencing of agents, employees or servants.

Section 1. The Penal Code is hereby amended by inserting therein at the end of title 11 a new section to be known as 384 R. and to read as follows:

Sec. 384 R. Corrupt influencing of agents, employees or servants.—Whoever gives, offers or promises to an agent, employee

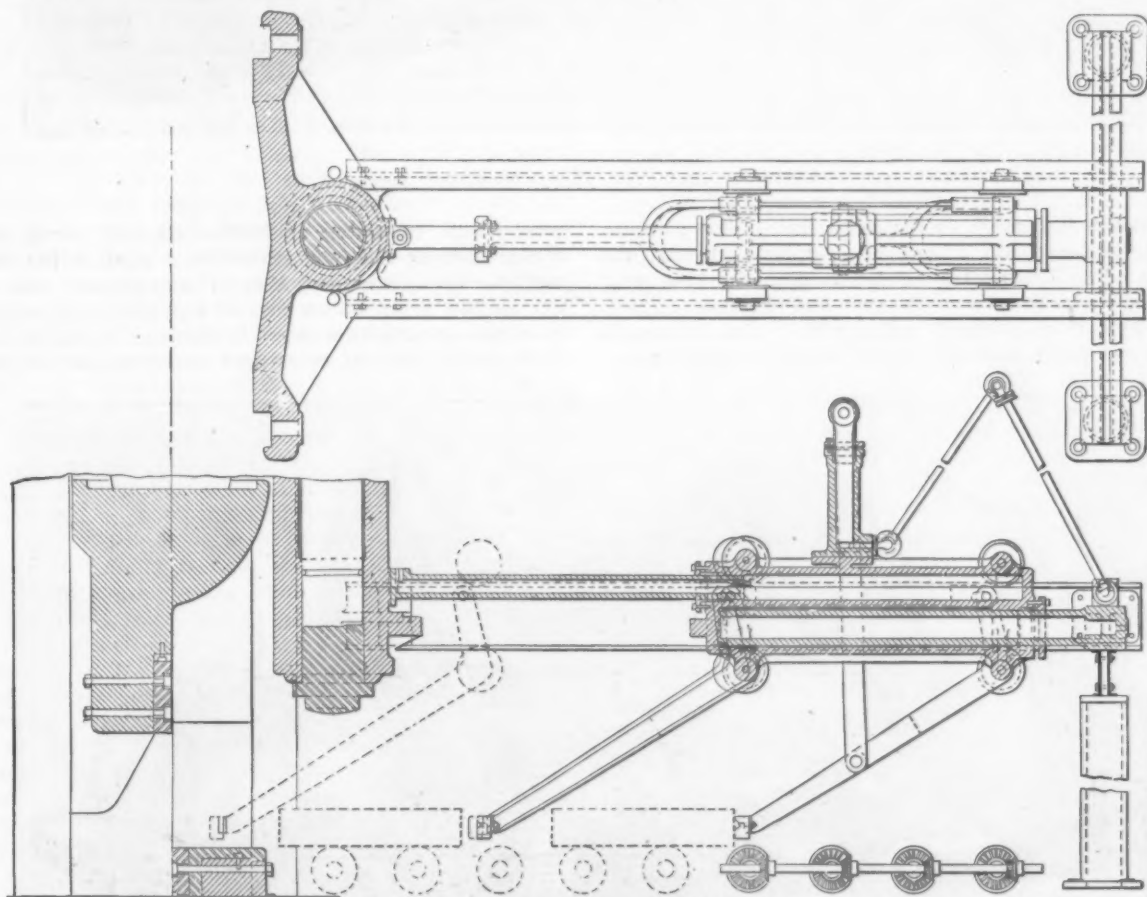


Fig. 2.—Plan and Elevation, Showing Details of the Pusher, or Billet Feeding Device.

cent. ad valorem. The collector's assessment of 50 per cent. was reversed.

George Borgfeldt & Co., New York, objected to the action of Collector Stranahan in levying a 60 per cent. duty on steel chatelaine bags and hat pins. Instead the importers maintained that the articles are dutiable at 45 per cent. as manufactures of which metal is the component material of chief value. General Appraiser Sharretts in his decision written for the customs court sustains the claim for lower duty on the chatelaine bags, but upholds the collector in his classification of the hat pins as jewelry.

Mention was made in these columns last week of an order for 10,000 tons of rails for delivery this year placed in the United States by the Grand Trunk Railway because the Canadian mill which had the contract originally failed to make the stipulated deliveries. We are advised that this does not apply to the Algoma Steel

or servant any gift or gratuity whatever, without the knowledge and consent of the principal, employer or master of such agent, employee or servant, with intent to influence his action in relation to his principal's, employer's or master's business; or

An agent, employee or servant who, without the knowledge and consent of his principal, employer or master, requests or accepts a gift or gratuity or a promise to make a gift or to do an act beneficial to himself, under an agreement or with an understanding that he shall act in any particular manner to his principal's, employer's or master's business; or

An agent, employee or servant who, being authorized to procure materials, supplies or other articles either by purchase or contract for his principal, employer or master, or to employ service or labor for his principal, employer or master, receives, directly or indirectly, for himself or for another, a commission, discount or bonus from the person who makes such sale or contract, or furnishes such materials, supplies or other articles, or from a person who renders such service or labor; and

Any person who gives or offers such an agent, employee or servant such commission, discount or bonus, shall be guilty of a misdemeanor, and shall be punished by a fine of not less than \$10 nor more than \$500, or by such fine and imprisonment for not more than one year.

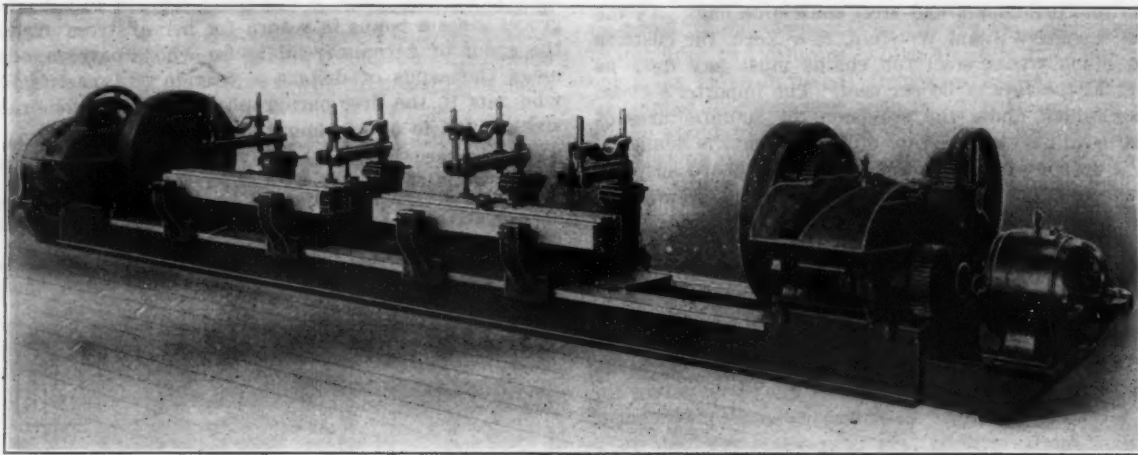
Sec. 2. This act shall take effect September 1, 1905.

A New Roll Lathe with Automatic Change Speed Gearing.

The roll lathe herewith illustrated has five intermediate changes of speed with a total ratio of 5 to 1. Fig. 1 is a view of the lathe, while Fig. 2 is an enlarged view of the head stock. The gearing is cast steel with cut teeth. The hand lever for operating the change gear is counterbalanced so as to make the change a very easy matter. The gears are so arranged that no two sets can

great rigidity. The lathes are built in all standard sizes, from 16 to 60 inch, with any length of bed plate, plano rest, &c. The United Engineering & Foundry Company, Farmers Bank Building, Pittsburgh, Pa., is the builder.

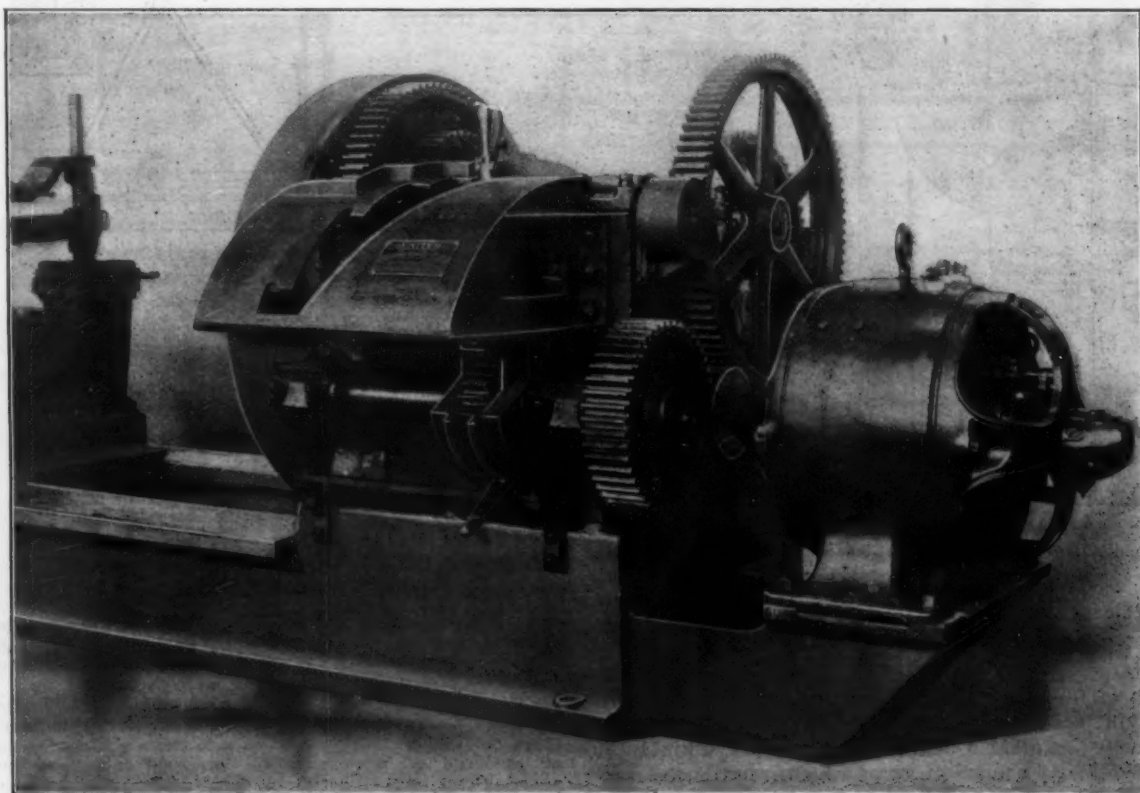
An estimate has been made of the size of the principal grain crops of the West and Northwest as represented by the number of carloads of wheat, corn and oats to be moved beyond county lines in the following States: North-



A New Roll Lathe with Change Speed Gear Drive.

be thrown into mesh at the same time. This arrangement eliminates any danger of stripping or locking the gears. The locking casting for holding the idler gear also acts as a guard over the gear and prevents accident. The lathe is so arranged that any type of motor can be used and easily connected to the driving arrangement.

west group, consisting of Minnesota and North and South Dakota; the four grain States west of the Mississippi—Iowa, Nebraska, Missouri and Kansas, and the five leading grain States east of the Mississippi—Ohio, Michigan, Indiana, Illinois and Wisconsin. On the basis of 1000 bushels per car for wheat and corn and of 2000



Head Stock for Roll Lathe with Change Speed Gear Drive.

These lathes are furnished with any of five different designs of housings, adapted for both the topping of structural mill rolls and for the crossing of plate mill rolls. The housings are made either of the open or goose neck type. The lathes are of very heavy construction, all the bearings being large and all parts well fitted together, so that vibration is entirely avoided. The bed plates are also of very heavy construction, affording

bushels for oats, the three great cereal crops give promise of a total of 1,000,000 carloads.

In a suit brought by the Pennsylvania Railroad Company against the city of Chicago for damages for freight cars burned in the Debs strike of 1894 a jury in the Circuit Court at Wheaton, Ill., has returned a verdict of \$100,000. The suit was originally brought for \$450,000.

Open Hearth Molten Metal Processes.

In a recent number of *Stahl und Eisen* Oskar Simmersbach describes and compares the various methods which hitherto have been worked to use molten iron in open hearth practice. He classifies the processes into two groups, first, those in which the oxidation is effected by the oxygen of the air, and, second, those in which iron ore supplies the oxygen. To the former group belong (1) the duplex, (2) the Daelen-Pscholka and (3) the Kernohan processes, while the second group is represented by (4) the pig and ore process and the methods of (5) Monell, (6) Bertrand-Thiel, (7) Talbot and (8) Surzycki.

I.—The Duplex or Combined Bessemer and Open Hearth Process.

The use of the Bessemer converter necessitates an iron with considerable silicon and manganese in order that the sulphur can be kept low at the blast furnace. The Bessemerizing effects the removal of the manganese and silicon, so that in the open hearth furnace, where ordinarily most of the lime used is needed on account of the silicon, the formation of a large body of slag is avoided. There is also a partial decarburization, the extent of which depends upon the amount of phosphorus present, as the formation and action of a good dephosphorizing slag in the open hearth furnace require time.

In Witkowitz, where the process was introduced in 1878, when using iron with 1.2 per cent. silicon, 2.7 per cent. manganese, 0.2 per cent. phosphorus, 3.7 per cent. carbon and 0.02 per cent. sulphur in the converter, and a charge of 10 tons, the blow lasted about eight minutes. The metal then contained only 0.1 per cent. carbon and 0.4 per cent. manganese. A high temperature is necessary to transfer the charge, as, in order to avoid the presence of acid Bessemer slag on the basic hearth, the ladle cannot be tilted, but the charge must be tapped out through the bottom of the ladle. The metal is then dephosphorized in the usual way in the open hearth furnace, which takes but a short time. If no pig iron or scrap is added about three hours are required for each heat.

Although by this process iron containing too much phosphorus for the acid and too little for the basic Bessemer can be converted into steel of excellent quality the cost of installing and operating such a plant is very high, as a mixer and a second converter are practically indispensable in order that an occasional high sulphur cast from the blast furnace shall not necessitate a stop in the steel works. If only one converter is installed and several Bessemer charges are necessary for one open hearth heat the furnace must each time wait on metal and also whenever the bottom is changed. The yield is very low, the vessel loss being very little less than in the ordinary Bessemer practice, as it is mostly in the early part of the blow that metal is thrown out. The furnace loss cannot be replaced by using ore, because the low percentage of carbon and silicon in the bath would be insufficient to reduce it.

II.—The Daelen-Pscholka Process.

In this process the chief object is to avoid the transference necessary in the duplex method and at the same time reduce the cost of installation. This is achieved by the use of a converter in the shape of a square ladle, which carries the metal from the blast furnace to the open hearth furnace, and in which preliminary refining is carried out at the former by means of hot blast, introduced at a low pressure from the side and played on the surface of the metal. The latter is then taken to the open hearth furnace, where the charge is completed in the usual manner.

Comparing the two processes, the use of hot blast increases the oxidation in the converter and also the temperature at the surface. The oxidation, however, will not be so complete as if air were blown through the metal, for in the ordinary Bessemer process a 10-ton charge with a blowing engine of 17,600 cubic feet capacity per minute requires eight minutes for completion. An especial difficulty caused by surface blowing is the destructive action of the flame on the wall of the vessel opposite the tuyeres. To avoid this Daelen has recently

introduced a converter of circular form with radial or tangential tuyeres.

The cost of maintenance and operation in this process is considerably less than that of the preceding one. On account of the lower blast pressure the cost for steam is less. Furthermore, the loss is not so great, as is shown by the fact that when using an iron with 2.2 per cent. manganese, 1 per cent. silicon and 3.5 per cent. carbon the loss was only $7\frac{1}{4}$ per cent., carbon being brought down to 1 per cent. This could probably be reduced by the use of metal with 1 per cent. manganese, which would be sufficient for the purpose. Furthermore, when using high silicon iron it is possible to utilize the excess heat obtained by the combustion of silicon by adding ore, which hastens the process and increases the product.

III.—The Kernohan Process.

In this process the molten metal is poured slowly into a long furnace, through which it passes in a shallow stream in an inclined runner which forms the bottom of the furnace. In this runner tuyeres are set, through which air is blown, thus refining the metal as in a Bessemer converter. As the necessary heat is obtained by the combustion of the silicon and manganese these elements must be present in sufficient quantity. The depth of metal is only about 3 inches, so that the large surface and small mass of the bath are extremely favorable for refining.

The action of the blast is more complete than in surface blowing and is even more rapid than in the duplex process, without the necessity of the high pressure required in the latter. At the works of Bolckow, Vaughan & Co., Middlesbrough, England, the time which the metal required to run through the furnace, using a blast pressure of 10 pounds per square inch, was only five or six minutes. It is, furthermore, convenient that the duration of the blow does not need to be very exact, as it is possible to take tests before transference to the open hearth furnace. After the preliminary refining the metal passes into a runner, in which it is held back by means of a dam and thus collected until an empty ladle is placed underneath. The operation is therefore continuous and delays at the open hearth furnace are reduced.

The completion of the charge is carried out in the usual manner and with the same speed as in the duplex process. The loss in the Kernohan process amounts to about 9 per cent., which cannot be reduced by the introduction of ore. The lining of the first furnace suffers considerably and the repairs to its bottom do not cost much less than the Bessemer. Changing the tuyere is not by any means a simple operation, so that long delays occur, which would seem to make the installation of an extra furnace of the same type desirable. However, this method of operation costs less for maintenance by reason of the simplicity of the mechanical arrangements, which also results in low cost of installation.

IV.—The Pig and Ore Process.

In the processes previously described the oxidation is carried out by means of impure oxygen, as the air contains 77 per cent. of other elements, while when indirect oxidation is made use of to refine and decarburize the iron the pure oxygen of iron oxide is used, which, however, must first be separated from the ores, necessitating a great expenditure of heat. This use of heat to break up the oxides of iron forms an important factor in judging processes which use indirect oxidation, as may be seen by the following consideration:

The reduction of ferric oxide by molten iron is effected in two stages. First is the formation of ferrous oxide by means of carbon, which consumes heat amounting to 204 calories per pound of iron. According to the formula, $C + Fe_2O_3 = CO + 2FeO$, each pound of carbon converts 13.3 pounds of Fe_2O_3 , containing 9.3 pounds Fe, into FeO.

Calories.

In this reaction one pound of C develops..... 1,120
The reduction of the Fe_2O_3 to FeO requires $9.3 \times 204 = 1,897$

Heat consumed..... 777

The ferrous oxide thus formed is then at a lower temperature, reduced principally by silicon, manganese and phosphorus, but as the temperature increases there is a

greater tendency to combustion on the part of the carbon. For silicon the formula is $\text{Si} + 2 \text{FeO} = \text{SiO}_2 + 2 \text{Fe}$, and as the atomic weight of silicon is exactly one-half that of iron (28:56), 1 pound of the same reduces 4 pounds of iron.

	Calories.
In this reaction 1 pound Si develops by combustion.....	3,552
4 pounds Fe reduced from FeO requires 4×612	2,448

Heat gained.....	1,104
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Manganese reduces according to the formula $\text{Mn} + \text{FeO} = \text{MnO} + \text{Fe}$, the thermal effect being as follows:

	Calories.
1 pound Mn develops by oxidation.....	785
1 pound Fe consumes.....	612

Heat gained.....	173
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By the oxidation of phosphorus according to the formula, $2 \text{P} + 5 \text{FeO} = \text{P}_2\text{O}_5 + 5 \text{Fe}$, each pound of P reduces 4.5 pounds Fe, the thermal result being:

	Calories.
1 pound P develops by oxidation.....	2,676
4.5 pounds Fe requires 4.5×612	2,754

Heat consumed.....	78
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The combustion of carbon is according to the formula $\text{C} + \text{FeO} = \text{CO} + \text{Fe}$, each pound of C reducing 4.7 pounds Fe, the thermal effect being:

	Calories.
1 pound C develops.....	1,120
4.7 pounds Fe requires 4.7×612	2,876

Heat consumed.....	1,756
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It will be seen from the above that indirect methods of oxidation are only possible in the open hearth furnace where extra heat is available, as the heat which results from the oxidation of the elements in the pig iron is used to disassociate the ores, a consideration which, especially in the case of phosphorus, deserves notice. Favorable for the development of the duplex and all other processes with molten metal is the circumstance that the greater the amount of the reducing elements (Si, Mn, P, C) present the greater is the amount of ore reduced, and, as a matter of fact, the product of a furnace when making steel not too low in carbon increases as much as 60 per cent.

It was to be expected therefore that by this method the loss of the manganese and metalloids would be replaced from the iron reduced from the ore, as was the case at the works of the Glasgow Iron & Steel Company, where when using an addition of 30.6 per cent. ore a product of 99.2 per cent. of the metal charged was obtained. In proportion, however, to the amount of ore added the body of the slag increases, which results in various difficulties; especially will the lining in the furnace be attacked, so that its life is short. Furthermore, the output of the furnace is reduced, as the reduction of the ores requires a longer time. The time of the heat in Wishaw was eight hours and at Witkowitz, with 20 to 22 per cent. addition of ore and 10 per cent. scrap, ten hours, and at the same time the labor and fuel costs increased.

In view of this fact the ore process in its original form for iron with a medium percentage of phosphorus did not find many users. With iron containing less than 0.1 per cent. phosphorus and 0.2 per cent. sulphur the prospects are changed. Under favorable conditions when using an easily reduced ore with 68 per cent. iron as much as 85 per cent. of the latter can be gotten out, so that a yield of 105 per cent. may be achieved.

V.—The Monell Process.

A. Monell of Pittsburgh developed the pig and ore process by charging limestone and ore into the basic open hearth furnace and thoroughly heating these materials before the molten metal is poured in. The iron contained 3.9 to 4.1 per cent. carbon, 0.5 to 0.8 per cent. phosphorus, 0.5 to 0.9 per cent. silicon, 0.8 to 0.9 per cent. manganese and 0.04 to 0.07 per cent. sulphur. An hour after the introduction of the metal the bath is free from the phosphorus, silicon and manganese, while the carbon is reduced to about 2 per cent. After removal of the phosphoric slag the temperature is increased and the metal is decarburized in the usual manner.

The preliminary heating of limestone and ore before charging the iron is a step in advance. The furnace lasts

longer, the phosphorus is easily and quickly separated and the time of the heat is correspondingly reduced. On the other hand, the mass of partially fused ore and limestone tends to stick to the bottom of the hearth, so that in time the capacity of the furnace is reduced.

The reaction when pouring hot metal on the ore and limestone is not so violent as if they were molten, but during the period a foamy mass is formed and as much as 80 per cent. of the slag runs off, accompanied, however, by no small amount of iron. This period of foaming, caused by the low temperature of the iron from the blast furnace, causes the decarburization to be slower, and, as no short time is needed to charge and heat up ore and limestone, the output of the furnace is not all that could be desired. The production of a 40-ton furnace in six days amounts to 662 to 718 tons. The loss is made up by the ore charged, and there is even a gain of 2 or 3 per cent., but the relative amount of ore reduced is still low.

VI.—The Bertrand-Thiel Process.

In this process an endeavor is made to divide the addition of ore into two periods and between two basic furnaces, and by the separation of the inactive slag before the second addition of ore to increase the efficiency of the bath of iron in the second furnace. In the first furnace a part of the lime and ore, together with solid pigiron, is charged and molten metal added to the same. When the boiling period begins a further addition of ore and lime is made, enough being added so that the silicon and manganese are completely removed, the phosphorus reduced to 0.01 or 0.02 per cent. and the carbon to about 2 per cent. This stage is reached in two and one-half hours from the beginning of the charge and the reaction then ceases.

The partially refined metal is now separated from the slag by transferring the metal to a second open hearth furnace, where it is poured upon heated scrap and limestone, after which by the addition of fresh ore and limestone a new slag is formed. During this period the metal increases rapidly in temperature, as it is only covered by a comparatively small amount of slag. As the latter is not thinned and weakened by the old cinder and has in consequence iron in excess the mutual action of the two is intensified, so that decarburization takes place very rapidly.

If the addition of the ore in the first furnace is measured in the method indicated the period of completion is about the same as that of the preliminary refining, so that delays are avoided. The total time of the heat amounts to five or six hours, so that each furnace works four to five charges per day—that is, double as much as in the other ore processes. The yield is as high as in the Monell process, up to 103 per cent., and the slag from the first furnace contains a percentage of phosphoric acid which makes it of equal value as that from the basic Bessemer.

The disadvantages of the pig and ore process appear also in this to a greater or less extent, especially the wear on the lining, which is very considerable in the first furnace, but on account of the smaller amount of slag is less in the second. These disadvantages, together with those occasioned by the transference from one furnace to another, are counterbalanced by the production. At the Hoesch Steel Works in two furnaces of 27 tons capacity there were produced in 24 hours 190 tons, as against 175 tons in the scrap furnace. This figure can be considerably increased if the period in the first furnace is shortened by means of preliminary heating of the ore and limestone. By this means the yield would also be increased, as hitherto 25 per cent. of the refining has been carried out by the oxygen in the gases, so that if the time of the heat is shortened the furnace gases will have a less oxidizing effect and will therefore make necessary a greater addition of ore. At the same time by preheating the ore and limestone the regularity of operation will be increased.

It must not be forgotten that when working high phosphorus iron the low temperature in the first furnace is favorable to the separation of phosphorus which concentrates in the preliminary slag, whereas at a higher temperature the carbon burns more rapidly than the

phosphorus, and then the larger part of it, up to 50 per cent., does not enter the slag until it reaches the second furnace.

Regarding the quality of ores used, those which are siliceous and low in iron should be avoided, as an increased body of slag is opposed to the main principle of the process and to a certain extent makes its advantages illusory. Iron of any composition can be used in this process, but a high percentage of manganese is a disadvantage, as it delays the operation. Phosphorus, on the other hand, on account of the increased value of the slag, is not undesirable.

VII.—The Talbot Process.

In this process in order to increase the temperature of the bath the fluid iron is mixed in with a bath of steel, whereby the temperature of the iron, aided also by the combustion of the gases, is raised in a short time from 1200 degrees C. to that of the steel—that is, 1500 to 1700 degrees C.—whereby the action of the oxide of iron on the fluid metal is intensified.

When starting a Talbot furnace of 100 tons capacity at Frodingham, England, the furnace is first filled with 50 tons of scrap in small charges. When this is melted down roll cinder or ore and limestone are added in order to form a slag rich in oxides. Fifteen tons of molten iron are then added slowly without shutting off either gas or air. When the reaction is at an end and the bath has become quiet ore and limestone are again added and another 15 tons are poured in, and this is continued until the furnace is full. When the heat is so near completion that only small bubbles appear the slag is run off through a slag hole by tilting the furnace, and the charge is dephosphorized with burnt lime, lump ore being added at the same time. When the metal has become sufficiently hot and soft the furnace is tilted and 25 to 30 tons of steel are poured into the ladle. Into that remaining in the furnace roll cinder or ore is added, which is rapidly taken up by the remaining slag, which now contains but few oxides. By the time the necessary repairs are made to the banks the slag is in such condition that an addition of 25 to 30 tons of molten iron can be made without further delay. While this is being poured in the gas and air are completely shut off, as the furnace rapidly becomes hot by reason of the combustion of the elements of the iron. When the iron is all in the temperature of the bath increases because the carbon monoxide formed by the carbon combining with the oxygen in the slag burns on the surface of the bath when it comes into contact with the oxygen in the gas. As a result the preliminary refining of the iron is completed in from 30 to 40 minutes. The charge is finished in the ladle with anthracite and ferromanganese.

The main feature of the Talbot process is the continuously high temperature of the furnace, which results in accelerated action of the iron oxides, and instead of the bath simmering for hours, as is the case with the other ore processes, a violent boil results, which is the more active as the bath is low in carbon, never exceeding 0.5 per cent. The larger the furnace—that is to say, the more steel that remains in it—the greater is the surplus heat in the bath and the more easily will the variations in temperature be taken care of, which result from the nature of the ore process in general and from shutting off the gas each time the furnace is tilted. The rapidity with which the carbon of the molten metal is removed is shown by the fact that within 27 minutes the carbon is reduced from 0.46 to 0.15 per cent. and in 7 minutes from 0.55 to 0.44 per cent, a circumstance which makes the production of hard steel, such as used for rails, axles, &c., considerably more simple.

In addition to the more rapid decarburization the energetic reaction between metal and ore results in a greater reduction of the oxides of iron than in other indirect processes, as much as 90 per cent. of them being reduced and the yield being as high as 107 per cent. There is no limitation to the choice of the ore. At Frodingham a material with 45 per cent. iron, 8.70 per cent. silica, 6.24 per cent. alumina and 10.80 per cent. lime is used. The composition of the iron is also not so particular, as the large bath of disiliconized metal is

capable of taking care of high silicon in the iron without injury to the lining. If the iron contains manganese there is a separation of the sulphur similar to that which takes place in a mixer. A high percentage of phosphorus has the disadvantage of lengthening the process of dephosphorization, but, on the other hand, an iron with 1.8 to 2 per cent. of phosphorus, as used at Frodingham, yields a slag with over 16½ per cent. phosphoric acid. A further advantage of the large bath consists in the fact that the bottom of the hearth does not come in contact with the slag and is therefore protected.

The production of the Talbot process is considerably higher than in the other ore processes, as a 100-ton furnace yields 25 tons of steel every three hours. A 200-ton furnace yields still more, because a larger amount of fluid steel is left in the furnace and because when 20 tons are tapped the time lost is not much less than if 40 tons are put into the ladle. At Frodingham a Talbot furnace makes 36 heats in a week, while the old style 40-ton furnace working with 70 per cent. pig iron and 30 per cent. scrap makes only eight heats. In Pittsburgh a 175-ton Talbot furnace of the Jones & Laughlin Steel Company produced 1600 to 1700 tons of steel weekly and gave such satisfaction that four more such furnaces have been built to produce 325,000 tons yearly.

Instead of the molten metal it is possible to work with an addition of scrap, which is quickly melted in the big bath of steel without loss by oxidation, which is hindered by the covering of slag. This fact adds considerably to the value of the Talbot process, since it makes it possible to smelt large quantities of iron ore in spite of its low specific gravity, so that by increasing the amount of ore charged from 20 to 40 per cent. it is possible to increase the yield to 115 per cent.

VIII.—The Surzycki Process.

The object of this process is to introduce continuous working in the same manner as that of the Talbot process without the necessity of using a tilting furnace. With this object the furnace is provided with two tap holes at different levels, which lead into a double runner, so that the slag and part of the metal can be removed from the furnace without completely emptying it. Cold scrap is first melted in the furnace and to this molten iron is added. When the bath has become quiet a considerable amount of ore is thrown in, followed by more molten metal, and this is continued until the furnace is full. Dephosphorization is carried out in the usual manner with lime, and when decarburization has proceeded to the point desired a part of the metal is run out through the upper tap hole into the ladle, where it is finished by means of charcoal and ferromanganese. The tap hole is then closed with burnt dolomite, the banks are made up, ore or roll cinder is added and another charge of molten metal is thrown in. The tap hole of a 40 to 50 ton furnace is so placed that 25 to 30 tons of finished metal may be poured off and 20 to 25 tons left in the furnace. The lower tap hole is only used when it is necessary to completely empty the furnace.

In Czenstochau, where Surzycki introduced his process in 1902, using an iron with 0.6 per cent. phosphorus, 20 to 25 per cent. ore and a yield of 102 per cent. of the metallic charge, the product was 75 to 90 tons of steel—that is to say, an increase over the pig and ore process of 15 to 28 per cent. Compared with the Talbot process there is, however, a considerably smaller yield and diminished capacity, the cause of which is the greater dilution of the bath in the Talbot process, the percentage of carbon in the stationary furnace being twice as high as in the Talbot. Another reason is in the greater surplus of heat, which makes better regulation of the operation possible. The output is also smaller than that of the Bertrand-Thiel process, even when it is taken into consideration that the furnace at Czenstochau is only 8¼ feet wide, 20 inches deep and not well constructed. The low output naturally increases the running expenses. The first cost of a stationary furnace with the tapping arrangement described is of course considerably lower than that of a tilting furnace, but it must not be forgotten that this arrangement naturally increases the danger of a heat breaking out.

Conclusion.

Of the processes described the Bertrand-Thiel and the Talbot processes have entered into effective competition with the older methods of working, but the scrap melting process holds the field wherever old material is available at a sufficiently low price. One of the disadvantages of the Bessemer process, either acid or basic, is that of restriction to an exact iron analysis, while the Bertrand-Thiel and Talbot processes permit of the use of an iron of almost any composition. Furthermore, the latter permit of the use of scrap to any extent desired, which is not the case with the Bessemer.

As the conversion cost of basic Bessemer steel is very little less than that of the Bertrand-Thiel process and is more than the Talbot process there is no doubt that the future belongs to these two—namely, the Bertrand-Thiel, where quality and variety are wanted, and the Talbot, where large quantities of one kind of steel are required. Neither process must be regarded as completely developed, and that of Talbot especially is capable of being still further improved.

It is in any case certain that the production of open hearth steel from molten metal is more advantageous than from solid pig, and the steel works of the future for this reason will always be connected with a blast furnace plant. This will permit not only the saving by the use of molten metal, but also the utilization of the waste gas from the furnace in the steel works. A further advantage is that the quality of open hearth steel made from molten iron is better than that made from remelted pig on account of the lower percentage of oxygen in the former.

The Allis-Chalmers Company.

The report of the Allis-Chalmers Company made public in the past week covers the 14 months ending June 30, 1905, the end of the fiscal year having been changed from April 30 to June 30. The consolidated profit and loss account for the 14 months, including the receipts of the Bullock Electric Mfg. Company for 16 months ending June 30, shows profits on operations, after deducting expense of manufacturing and selling and provision for bad accounts, of \$1,146,981. For maintenance, repairs and renewals on buildings and machinery the expenditures were \$752,860, and there was charged off for depreciation \$325,139, making the total \$1,077,999. The net profits were thus \$68,982, which compares with net profits of \$952,624 for the 12 months ending April 30, 1904. Adding \$68,982 to the balance of \$624,835 on April 30, 1904, gives \$693,817. From this is deducted \$345,528 for special expenditures during the year, leaving the surplus on June 30, 1905, at \$348,289. The additions to plant in the 14 months were \$303,685, less \$14,000 received for real estate sold, making the total capital expenditure for the fiscal period \$289,685. The general balance sheet as of June 30, 1905, compares as below with previous 12-month periods:

	Assets.			
	June 30, 1905.	1904.	April 30, 1903.	1902.
Real estate, &c.	\$30,535,770	\$30,246,084	\$29,199,493	\$27,352,082
Bills and accounts receivable	3,628,778	3,437,520	2,475,579	2,778,721
Merchandise and materials	3,478,725	2,914,878	5,151,800	3,333,665
Cash	516,483	1,060,113	1,628,009	4,514,167
Bullock Electric Mfg. Co., &c.	.....	463,000	.....	.....
Bonds and shares	165,000	.....	.....	.....
Totals	\$38,324,756	\$38,121,596	\$38,434,881	\$37,978,635
	Liabilities.			
	June 30, 1905.	1904.	April 30, 1903.	1902.
Preferred stock	\$16,150,000	\$16,150,000	\$16,250,000	\$16,250,000
Common stock	19,820,090	19,820,000	20,000,000	20,000,000
Accounts payable	1,080,951	1,014,396	1,079,671	1,139,500
Mortgage due March, 1905.	.....	34,000	.....	.....
Dividends payable	.....	.....	284,375	284,375
Depreciation reserve	815,388	478,365	.....	.....
Bullock Electric Mfg. Co.	110,128	.....	.....	.....
Surplus	348,289	624,835	820,835	304,760
Totals	\$38,324,756	\$38,121,596	\$38,434,881	\$37,978,635

The following extracts are made from the report of President Warren:

President Warren's Comments.

"All the property of the company is owned in fee except the Bullock Electric Works at Norwood, near Cincinnati, Ohio, which are held under a long lease. The entire property of the company is free from mortgage or other lien. No mortgage can be placed upon the property without the assent of 75 per cent. of the amount of preferred stock outstanding.

"Reference is made to the charges that have been made in the accounts covering the expenditures for the purchase of patent rights and the work of development for the manufacture of new lines of apparatus. Although these charges are for expenses incurred in preparation for new branches of business, and might be carried forward as assets or deferred charges, to be gradually or otherwise provided for from the future operations of the company, yet it has been considered wisely conservative during this period of suspension of dividends to charge off the entire amount of such disbursement of the past year.

"The contraction in general business referred to in the last annual report, as then justifying the postponement of dividends, continued during the first half of the last fiscal period, with particular manifestation in the steam engine department of this company. This was due largely to the introduction of steam turbines, especially those of large capacity, for which certain manufacturers had been preparing for several years.

"The present manufacturing space and facilities being inadequate for the manufacture of the new lines of machinery referred to, and in order to provide for the economical manufacture of apparatus in the same works where the prime movers are constructed, it was decided to make important additions to the West Allis Works, and new buildings are now in process of erection pursuant to the original plans therefor. The capacity of this plant will be nearly doubled by these enlargements. Particular attention has been devoted to developing a line of steam turbines, gas engines, centrifugal pumps, hydraulic turbines, steam turbogenerators, hydraulic turbogenerators, induction motors, street railway motors and controlling devices therefor, transformers, steam and hydraulic dredges and steam shovels. To the already well established line of mining and crushing machinery manufactured by the company has been added a line of steam and hydraulic dredges and steam shovels for heavy excavating and mining work.

"Soon after the commencement of this calendar year an improvement was manifested in the general business of the company, the orders increasing in April to the normal volume and since then exceeding in extent the previous record of the organization; but the results of these orders will be realized only upon their execution and the delivery of the work. This increase pertained more particularly to the older branches of the business of the company.

"The steam turbine rights heretofore acquired by this company have been supplemented in an important manner by further patent acquisitions and alliances, so that it is confidently asserted that this company is now prepared to place upon the market steam turbine and turbogenerating units that will enable it to retain its position as a leading manufacturer of steam engines of the most successful types. The works are now engaged in filling one of the largest single orders for steam turbines that has ever been placed in this country, the installation of which will be completed by the end of the present calendar year. A number of important contracts for hydraulic turbines have also been secured."

The St. Louis Expanded Metal Fireproofing Company, Century Building, St. Louis, has issued a notice warning all parties against infringements of its patents covering the manufacture of corrugated bars for reinforced concrete. The company claims that its patents cover all bars that can be rolled, having ribs or depressions, the sides of which make an angle with a plane at right angles to the axis of the bar less than the angle of friction between the concrete and the metal. It is claimed that the shape of the bar, whether circular, elliptical, square or flat, is entirely immaterial.

The Iron Outlook in Scotland.

The Warrant Market.

GLASGOW, August 25, 1905.—The half-million-ton mark has been reached in the warrant stock of Cleveland No. 3 foundry pig iron, yet, strange to say, the price remains firm in the neighborhood of 48 shillings. It is, while I write, 48 shillings 5 pence cash, and 47 shillings 10 pence to 47 shillings 11 pence, one month. The stock of No. 3 is 501,098 tons, while in the same stores are 62,000 tons of No. 4, of standard foundry and of hematite, not deliverable against ordinary Cleveland warrants. The expected squeeze of three months' short sellers, which was predicted to come off on August 19, did not, after all, eventuate, for the simple reason that the bull clique which caused the May corner has now lost its control of the market. It is evident that it has in the interim disposed of a good deal more than was supposed, and it is plain that they do not hold enough to make the price so as to squeeze the bears.

In fact, the warrants are now so much distributed that the market is again practically an open one, and although the daily and weekly transactions are not large they are sufficient to indicate the prevalence of a considerable bull sentiment in the trade somewhere. It is not in the Glasgow ring, which is still pessimistic and somewhat incredulous of the reported improvement in trade. It is regarded as curious that if trade is so much better, as some people suppose, so much Cleveland iron should still be going into store instead of into consumption. It is going into store now at the rate of 1000 tons per day. It would not now be sent into store if there were sufficient trade demand to take it away direct from makers' hands. It is the case, no doubt, that more foundry iron is now being sent from Cleveland to Scotland than for some time past, because in Scotland the founders are now pretty busy; but, *per contra*, less is being shipped abroad. Germany, for instance, is taking less, although reports come of exceptional activity among the German iron and steel manufactories. This means either that Germany is now smelting as much pig iron as she can use or that the price of Cleveland iron is too dear for her and she is filling her needs elsewhere.

The Effect of Heavy Stocks on the Iron Trade.

The Cleveland pig iron corner has both checked the outlet and increased the output of this particular iron. There are now 500,000 tons of it which nobody seems to want, for any buyer can get what he needs more cheaply from the makers than from the stores. But these 500,000 tons are not now, as they were recently, in one hand, and therefore the way is preparing for a bear raid. There never was such a quantity of Cleveland pig iron in evidence before, and the consumption of it has been checked by the price. The stock created by the bull movement earlier in the year remains as a bear element. Perhaps it is not to be regretted. Some people think that when we had the heavy stocks in the Glasgow warrant store that were habitual before 1900 the market was better regulated, or, at all events, more to the advantage of consumers, as the stock always operated against any arbitrary advances by producers. It is very easy in the absence of our former huge Scotch stock to remember only its advantages and to ignore its disadvantages—to forget what a hotbed it was of often disastrous speculation. But there are many, especially the brokers in the ring who used to grow fat on mere commissions on deals which are no longer possible, who lament these stocks, who would like to see them back again, and who rather welcome the idea of having a speculative center in the Middlesbrough warrant yards with Cleveland pig iron as its base, instead of Scotch G. M. B., as formerly in the Glasgow warrant yards. It seems not improbable that this idea will be materialized.

The quantity of Scotch G. M. B. now in the warrant stores is only 17,000 tons, but the Scotch furnaces are busy enough on steel making iron and special brands; so busy, indeed, that makers have again advanced prices 6 pence to 1 shilling per ton. The successive advances are not in response to the warrant market, but in the

ordinary course of trade. Scotch smelters are getting rid of all their output as fast as they can turn it out, and to check the pressure on them they put up prices. The advances have not as yet restrained business. Our steel makers are kept very busy, not only on contracts for shipbuilding material but on miscellaneous contracts for almost all sorts of steel material. Steel is coming more and more into use in this country in the framework of buildings, and this means a great deal to the future of the trade. At a meeting of the Scottish Malleable Iron Trade Association a few days ago it was decided to advance the prices of all grades of iron bars, hoops, angles, &c., by 2 shillings 6 pence per ton, making the basis price of crown bars £6 5s. per ton, less 5 per cent., and of best bars £6 12s. 6d. per ton, less 5 per cent.

A charterer has suddenly appeared for a steamer to load up to 4000 tons of Cleveland pig iron at Middlesbrough for Philadelphia. The freight offered is 6 shillings per ton, but up to the time of writing no ship owner has thought the offer good enough. This cargo is said to be for a pipe founder in or near Philadelphia, on the seaboard, and is for the manufacture of iron pipes for export, on which a rebate of the duty on the raw material imported will be allowed. Such a transaction hardly illustrates any set of the market.

The elements of strife in the engineering and shipbuilding trades are more lively than is generally supposed. The strike of the pattern makers is not yet at an end, and it has lasted nearly five months. If the pattern makers get the advance they struck for, there will be a perfect tornado of demands for advances in other branches of engineering and shipbuilding labor. The shipyard workers in the North of England have already made a demand for an advance, which demand may be repeated here. It depends on the course of trade within the next month or two whether or not we have a great labor struggle this year.

B. T.

Labor Notes.

The strike of the International Brotherhood of Foundry Employees against the Rider-Ericsson Engine Company, a member of the New York and New Jersey Foundrymen's Association, came to an end on September 2, the men making application for reinstatement. Thus far only 8 of the 52 strikers have been taken back, and these as individuals without any concession from the firm. The strike has been marked by violence and by intimidation of those who took the strikers' places.

The Deane Steam Pump Company, Holyoke, Mass., has adopted an apprentice system under which the young men who bind themselves to the agreement are to work for a term of 12,000 hours, which shall be divided into eight periods of 1500 hours each, the compensation to be 5 cents an hour for the first period and an additional 1 cent an hour for each succeeding period up to the sixth period, the pay for which shall be 10 cents. For the seventh period wages shall be 12 cents an hour and for the last period 13 cents. At the end of the full term each apprentice shall receive a bonus of \$100. This bonus is offered solely as an inducement to apprentices to complete their contracts fully and satisfactorily, and it is understood that no part thereof shall be deemed earned until the contract has been so completed. The apprentice binds himself not to accept employment in any other machine shop during the four years next ensuing after the date of the apprentice agreement.

Some trouble in the building trades of New York may result from the proposal of the Employers' Association to have all contracts expire on December 31 of each year instead of on April 30. The employers claim that contracts made January 1 will enable them to bid on contracts with greater certainty as to labor cost. The employees claim that such a change will place them at a disadvantage in making terms with employers, because more men are out of work then than at any other time of the year.

of tonnage by independents, and this is following precisely the line that was undertaken by James J. Hill and his Great Northern Railroad when he undertook his campaign to secure traffic from the Mesaba range to Duluth after the organization of the United States Steel Corporation. The development is new so far as water transit is concerned and its outcome will be watched with great interest. It will have a tendency to complicate the general situation somewhat and may result in the organization of new iron manufacturing enterprises along the lower lakes.

The Chicago Tunnels and Settling Buildings.

The reports from Chicago that several of the massive buildings adjacent to the lines of the freight tunnels have settled more or less and thereby been damaged to a serious extent may be accepted with the proverbial salty grain. It is difficult for any one familiar with the plan and method of construction of those tunnels to conceive how they could be the cause of the settlement of any building in their vicinity to such an extent as to mean disaster or even to produce moderate distortion of the walls.

The preliminary studies made by the engineers convinced them that it was easily possible to build a deep tunnel conduit system that would in no way endanger adjoining property and would not interfere with other underground rights and privileges. The subsoil of Chicago is a firm clay, free from pockets and practically impervious to air. The last characteristic was demonstrated by the small size of the compressors necessary to maintain the required air pressure. The work was prosecuted according to the pneumatic method, but the pressure of air was only from 7 to 9 pounds, and in some cases only 5 pounds. Air pressure was not employed because the tunnel required its support during construction, but as a protection against labor troubles. With the work under pressure unfinished sections could be left for an indefinite period without any risk of settlement.

Two sizes of tunnels have been built. The trunk conduits are 14 feet by 12 feet 9 inches and the small, or lateral, conduits are 6 feet by 7 feet 6 inches. Both were built of concrete made with American Portland cement, most of it being mixed in the proportion of five parts of broken stone and screenings to one part of cement. Some of it was composed of gravel and sand in the same ratio. The large conduits had 21-inch bottoms and 18-inch walls of concrete, the small ones having 13-inch bottoms and 10-inch walls.

It is very evident that in order to guard against any settlement taking place it was of the utmost importance that no openings or voids be left outside of the finished tunnel. The surrounding material must remain in precisely the same condition it was before the work was begun, and there must be no undermining of its support. The method of building provided for this. After the heading had been excavated to the outside dimensions of the tunnel the concrete for the bottom was put in and thoroughly tamped. Channel iron ribs of the same shape as the interior of the tunnel were then placed in position. Lagging was placed on the ribs, and then the space between the lagging and earth was filled with concrete carefully tamped in. Finally the concrete key was tamped in in the same way.

By this means there was formed an irregular concrete cylinder of ample strength to resist any compression load that future building operations might bring upon it. During the operation the surrounding material had not been disturbed to any greater extent than it would have

been had the tube been forced into place bodily. During the discussion of a paper by George W. Jackson, chief engineer of the tunnel company, the author was asked if the roof of the tunnel was strong enough to carry the foundation of a future subway and a heavy rolling load. He replied: "Yes, you could place the Auditorium on top of it and it would not disturb it any."

The Activity in Lake Shipbuilding.

It is perhaps overstating the situation to say that the lake shipyards have now booked all the orders for vessels they are able to turn out in 1906. Attention is called by the *Marine Review* to the fact in this connection that along with the growth of the commerce of the lakes in the last two or three years the shipyards have enlarged and new yards have been established. While it is true that more and larger boats are now under contract or under construction than at any time in the history of lake shipbuilding this condition, in view of the great rapidity with which boats can now be turned out, is but temporary. The transformation has been amazing. Less than 12 months ago the outlook seemed dark enough. For months the lake yards had had very slack business and there was a feeling that unless the ore movement down the lakes increased tremendously there was no prospect of any large additions to the lake fleet. However, by one of the marvelous changes which the iron trade knows so well the very opposite of the conditions of last year now exists, and the abundance of recent orders for vessels has given the general impression that the lake yards are rapidly drifting into a state of serious congestion. There will be ample tonnage, and of modern capacity, to care for all the traffic of the lakes next year, and there is no good reason to doubt that the lake yards will book a further goodly number of vessels for delivery in 1906.

Regulating the Price of Illuminating Gas.

The matter of the supply and the price of illuminating gas is of much less importance to owners of industrial establishments than some years since. It has been largely relegated to a minor place because of the widely extended use of electricity for lighting and of a considerable use for other purposes formerly supplied by gas, but it is still an element to be taken into serious consideration in many lines of manufacture. In the larger cities the price is generally low. The larger the city the lower is the price, though this rule has its exceptions. Everywhere the price is pretty high as compared to what it would be if the London sliding scale system were in use in American cities and towns. This scale regulates the price on the basis of the dividends paid to the stockholders of the gas companies.

The Massachusetts Gas and Electric Light Commission is now making an investigation of the London system under authority of the Legislature. The price of gas varies tremendously not only in that State but in every part of the Union. In places only a few miles apart, with the same cost of materials and labor, the price will vary from \$1 to more than \$2 per 1000 cubic feet. Gas companies frequently pay dividends that are all out of proportion to those paid by railroad companies and other public service corporations. Massachusetts has taken cognizance of this to some extent by giving its commission summary power to regulate the price of gas to the consumer, but it cannot force gas companies upon which the public is dependent to employ modern methods of producing gas or to overcome inefficient management.

The London system is designed to stimulate the management to better methods. Taking a base selling price of gas and a base dividend, it makes it imperative that the dividend rate shall not advance without a decrease in the price of gas. If, for example, the selling price is \$1 and the dividend 6 per cent. the price must be reduced 8 cents per 1000 feet before the dividend can be increased to 7 per cent. It may easily be seen that such a restriction must be a benefit to the consumer, though it may have a tendency to reduce the value of gas stocks.

For special purposes other than lighting gas may be indispensable to the manufacturer, and though in some places he may get a reduced price by using large quantities, yet he oftentimes has to pay too high a rate. The present agitation of the gas question, which seems to be widespread, should prove of value in the results of such investigations as that of the London sliding scale system.

Commercial Benefits of the Asiatic War.

The Russian-Japanese War has been a source of much profitable trade for American manufacturers of metal lines. Great quantities of other materials have been purchased in this country for the use of the armies in the field and for arsenals, shipyards, hospitals and barracks. The total has reached many millions of dollars, which would not have been spent but for the war. Against these figures must be placed the loss of trade which results from the natural impoverishment of two great nations whose energies have been strained to the one end of war. This loss will continue for a time, and the purchase of munitions of war and the materials and tools with which to fashion them will be suspended to a greater or less extent, especially by the Japanese, for Russia will probably replace much that has been lost during the struggle.

The balance seems to be materially on the profit side of the American ledger—that is, more has been gained than lost in trade. But the best results of the terrible war are yet to come, considering the question for the American manufacturer from a purely selfish standpoint. Russia bids fair to enter upon a reconstruction period, perhaps gradually at first but with accelerating impetus. A great war, like a great conflagration, sometimes proves to have its blessings as well as its malevolent side, and to Russia if the results of the war shall spur her on to better social and industrial conditions an incalculable good will have been accomplished. If this be true, if Russia is to awaken industrially, great quantities of American machinery and raw materials will be required. The world will, of course, compete for the increasing market, but no one doubts that the United States will have a large share.

Japan has already progressed far in its development on Western lines, but great sums of money and continued intelligent energy must still be expended. American manufacturers should find that the very lucrative market that has developed under the imperative needs of war will continue without material abatement of volume during the first of the new life of the island empire under the *régime* of peace, but for munitions of peace and not of war, and that this demand will increase as Japanese brains and energies are directed toward organizing industry to its fullest extent.

Domestic disturbances resulting from the war should not menace Japan, and conditions promise to adjust themselves in Russia. The United States must be regarded as the friend of both countries in the splendid part that American statesmanship has played in bringing about an

amicable understanding between the belligerents. The results, considered as a business proposition, and entirely apart from the humanitarian side, should be an increasing American trade. It would seem to be an excellent time for American manufacturers to make special efforts to win new business in the two countries which are now about to cease making war upon each other.

British and American Blast Furnace Outputs.

The large outputs of American blast furnaces have given British furnacemen something to think about for a good many years. When the Iron and Steel Institute made its first American visit, in 1890, one of the particular matters under investigation by not a few of the visiting party was the heavy pig iron production at certain furnaces in the Pittsburgh and Chicago districts. Since that time the question has been under discussion frequently in British iron trade journals. One of the latter in a recent issue calls attention to the fact that whereas the average annual output of pig iron per furnace in the United States in 1870 was 6344 tons, the average output per furnace in 1903 was 95,000 tons—a fifteen-fold advance. In the same interval the average annual output of furnaces in Great Britain has increased from 9120 to 26,100 tons; in Germany, from 6400 to 41,000 tons; in Belgium, from 13,880 to 34,745; in France, from 4400 to 24,800 tons. Our contemporary asks why the British average should be under that of all the other iron making countries except France, and does not seem to reach a satisfactory answer to the question. It disposes of the argument of those who assign the low grade of British ores as the chief reason by citing the fact that while nearly one-half of all the iron produced in British blast furnaces is made from ores that average 50 per cent. in iron, the average content of the ores used in Germany, Luxemburg and Belgium does not exceed 40 per cent. in iron, while in France it falls below that percentage.

It has been customary for English critics who have questioned whether the fast driving of American furnaces is as desirable as has been claimed to speak rather in defense of the British policy of a slow life and a long life for blast furnace linings. Some change has come over sentiment on the other side, however, when the *Iron and Coal Trades Review* in commenting on the showing in the United States of nearly four times the average output of British blast furnaces remarks, "Surely this is a condition of things that should be inquired into."

The American Steel & Wire Company has placed a contract with the American Bridge Company for ten steel barges for use in transporting wire products from the Rankin and Braddock works to points down the Ohio River. The barges are 100 feet long, 24 feet wide, 8 feet deep, and have decks. Four of these steel barges have been in use by the American Bridge Company for some time, and as they do not leak a great saving in pumping is effected, which amounts to a good sum each year. These steel barges draw about 11 inches of water.

About \$340,000 was paid in bounties on coal oil produced in Canada during the last fiscal year. At the rate of ½ cent per gallon this would represent a net output of some 2,250,000 gallons of crude petroleum. This output of Canadian wells is far short of the total consumption. In addition to the home production there was imported during the year about 22,000,000 gallons of coal oil, naphtha, gas oil and the like products of petroleum.

OBITUARY.

T. T. HILLMAN.

T. T. Hillman, one of the leading citizens of Birmingham, Ala., died at Atlantic City, N. J., August 3, after an illness of many weeks. Mr. Hillman was at the time of his death the president of the Pratt Consolidated Coal Company, one of the largest and most successful corporations in the South. He was a director in the First National Bank of Birmingham, having served in that capacity during 21 years with the exception of 1892 and 1893. He was the last of the original directors of that institution. He was a director in the Birmingham Railway, Light & Power Company, and was a stockholder in many of the most substantial companies of the Birmingham district. In the 70's Mr. Hillman visited Birmingham and formed a partnership with H. F. De Bardeleben for the purpose of erecting the first Alice furnace,



T. T. HILLMAN.

which went into blast in 1880. In the fall of that year the Alice Furnace Company, with a capitalization of \$250,000, was formed. Furnace No. 2 was completed in 1883. In 1884 the Alice Furnace Company was consolidated with the Pratt Coal & Iron Company and in 1887 both were absorbed by the Tennessee Coal, Iron & Railroad Company, with T. T. Hillman as vice-president. Since that time Mr. Hillman had been a constantly active and increasingly important factor in Birmingham's development. He was one of that type of far-sighted men who discern industrial opportunities and make fortunes by building up great enterprises and giving employment to many other men.

THOMAS H. WELLS.

Thomas Holmes Wells, for many years identified with iron manufacturing and railroad operations in the Mahoning Valley, died at Youngstown, Ohio, September 1, 1905, in his ninety-second year. He was born in Dublin, Ireland, December 14, 1813. Until within a few weeks of his death he took an active part in the conduct of business affairs, being connected with a number of industries, including the Ohio Iron & Steel Company, Lowellville, Ohio, of which he was president. Mr. Wells emigrated to the United States in 1834, and settled for a short time in New York City. He followed his profession, that of civil engineer, and assisted in the survey of the first steam road constructed in New Jersey. Later he assisted in the original survey of the Pennsylvania Railroad. He removed to Youngstown about 70 years ago, and engaged in the mercantile business. He was one of the promoters of the Youngstown rolling mill, now a part of the Carnegie Steel Company. He was a partner of the late Paul Wick in several ventures, and was interested in a coal mine in Mahoning County, near Youngstown,

known as the Leadville shaft. He was also a large stockholder and president of the Pittsburgh, Shenango & Lake Erie Railroad, which is now a part of the Pittsburgh & Lake Erie system. He was a party to the development of the coal fields of Mineral Ridge, Ohio. Two daughters and a son survive Mr. Wells. One of the former is the wife of Richard Garlick of the Youngstown Sheet & Tube Company.

WILLIAM PATTERSON.

William Patterson, one of the pioneer iron manufacturers of New Castle, Pa., died August 30, aged almost 81. He was born near that city October 20, 1824, and was for several years of his early life engaged as a clerk in mercantile houses in New Castle and Pittsburgh. He embarked in the wholesale and retail drug business in New Castle in 1848, and in 1852 began the mining of coal along the Mahoning River near Lowellville, Ohio.



WILLIAM PATTERSON.

The expenses were heavy and his capital was soon exhausted. He was compelled to sell out his drug business and to borrow money at the almost ruinous rate of 18 per cent, but his business ability was such that he made the mines pay and shipped coal in large quantities to Cleveland and Pittsburgh. Three years later he embarked in the banking business. He continued in the coal trade, however, until the time of his death. In 1855 he was the employer of James McKinley, the father of the late President McKinley, the elder McKinley being mine manager. He was associated with the late Alexander L. Crawford and others in developing coal lands in Lawrence and Mercer Counties in Pennsylvania, from which they shipped coal to Lake Erie docks. He assisted in organizing the Etna Iron Company of New Castle in 1868, which was profitably operated until 1873, when it was sold to P. L. Kimberly of Sharon. This was a blast furnace proposition, and Mr. Kimberly added a nail mill and a rolling mill. The plant is now owned by the Republic Iron & Steel Company. Mr. Patterson was one of the heavier stockholders in the New Castle & Beaver Valley Railroad, the first railroad built into New Castle, and which was leased many years ago to the Pennsylvania Company. He was largely instrumental in establishing the New Castle Wire Nail Company, the Neshannock Furnace Company, the Shenango Tin Plate Company, the Shenango Valley Steel Company and the Knoxville & Nashville Railroad Company. He also assisted in erecting iron works in Terre Haute, Ind. Nearly all the iron plants in which he was interested during his 40 years in the iron business are now owned by the United States Steel Corporation. The principal exceptions are the New Castle Stamping Works, New Castle Forge & Bolt Company and Pennsylvania Engineering Works. He had been president of the National Bank of Lawrence County

for over 30 years. It is claimed that he did more than any other man to advance the material prosperity of his city and county. He had broad views of religion, and though never holding membership in any church he was the largest contributor to churches in the county. He leaves a widow and six children.

NOTES.

NATHAN H. WHITTEN, president of the Holyoke Machine Company, Holyoke, Mass., died August 23, after an illness of several months. He was born at Carmel, Maine, May 30, 1827, and located at Holyoke in 1852, being employed by the original Hadley Falls Company until its failure. When the Holyoke Water Power Company was formed he entered its employ and remained until its machine shop was sold and a company, consisting of Mr. Whitten, T. C. Page, T. B. Flanders, Richard Pattee and S. S. Chase, was formed under the name of the Holyoke Machine Company. He was its mechanical and hydraulic engineer and remained with the company until its death, being president since 1886. He had won an enviable reputation as a hydraulic engineer, and his judgment in financial and mechanical problems was equally sound and much sought. He was associated in many local business interests, among them the Ford Bit Company, as well as bearing his share in the support and administration of various helpful and benevolent organizations of Holyoke. He is survived by four children. His son Sumner H. is connected with the Holyoke Machine Company.

EDWARD R. LADEW of Fayerweather & Ladew, belt manufacturers, New York, died at Glen Cove, L. I., August 30, aged 50 years. He was born in New York City and was educated at Charlier Institute and Dr. Anthon's Grammar School. He became a member of the leather firm of J. B. Hoyt & Co. in 1877. In 1898 the firm of Fayerweather & Ladew was incorporated, and in 1904 Mr. Ladew became the sole owner of the business, continuing at its head until his death. He owned the large belting plant at Glen Cove and a branch factory at Charlotte, N. C., with stores in the leading cities of the country. He was a member of the New York Chamber of Commerce and of the following clubs: Union League, Lambs', Suburban Riding and Driving, Hide and Leather, Lawyers', Wyandanch, Paledom, Mountain Trout, Hempstead Harbor Yacht, Carteret Gun, and Accomack, and also held membership in the Holland Society and Liederkrantz. He was an enthusiastic yachtsman and owned the steam yacht *Oriente*, on which he made many long cruises. He is survived by a widow and two children.

OLIVER A. PARKER, head of the firm of E. L. Parker & Co., tin plate and metal dealers, Baltimore, Md., died August 28 after a short illness, aged 79 years. He was a native of Baltimore and was away from there only while being educated in New England. He is survived by a widow and two daughters.

GEORGE C. RUMBOLD, who superintended the building of the *Great Eastern*, died at East Orange, N. J., August 21, aged 80 years. He was born in London and superintended the building of many vessels for the British navy.

C. E. MILLS, proprietor of the C. E. Mills Oil Company, Syracuse, N. Y., died August 23, aged 57 years. Mr. Mills had long made a specialty of core and other oils and was well known to the foundry trade of the United States. His son H. E. Mills has been manager of the plant at Syracuse for the past ten years and will continue in that capacity.

ARCHER C. STITES, who has been for some time in charge of the structural department of Joseph T. Ryerson & Son, Chicago, died at Monteagle, Tenn., August 27. He was for a number of years Western representative of the Phoenix Bridge Company, Philadelphia, Pa. Mr. Stites was a member of the American Society of Civil Engineers and of the Chicago Engineers' Club.

FREDERICK HOHLFELDER, Cleveland, Ohio, proprietor of the Cleveland Chaplet & Mfg. Company, the Forest City Machine Works, Cleveland Copper Ferrule Company, Forest City Bedstead Company, the Cleveland Nickel

Works and the Globe Electric Mfg. Company, died August 18, aged 42 years, after passing through an operation. He is survived by a widow and three children.

July Iron and Steel Exports and Imports.

Imports of iron and steel are increasing this year, while exports of the same commodities are diminishing. The report of the Bureau of Statistics of the Department of Commerce and Labor for the month of July just received shows that the imports for the seven months then ended reached a total of 212,806 gross tons, as compared with 176,609 tons in the corresponding period of last year, and the exports footed 498,545 tons against 591,665 tons in the corresponding period of 1904. The figures for the month of July, it appears, do not show very much change from the June figures, being 67,071 tons, as compared with 71,490 tons in June. As compared with May, however, they show quite a shrinkage, as the total for that month was 74,073 tons. The details of exports of this class of commodities for the month and seven months are presented in the following table:

Exports of Iron and Steel.

Commodities.	July,		7 months ending July,	
	1905.	1904.	1905.	1904.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	1,882	4,611	31,541	26,324
Scrap	242	3,135	4,284	14,252
Bar iron.....	1,855	2,020	10,989	17,413
Wire rods.....	125	771	3,464	8,445
Steel bars.....	1,076	1,759	12,558	14,971
Billets, ingots, blooms.....	12,664	35,904	106,563	208,072
Hoop, band, scroll... ..	174	84	1,602	1,918
Iron rails.....	.....	4	.....	1,382
Steel rails.....	26,268	40,348	155,194	174,690
Iron sheets and plates ..	266	268	3,492	2,664
Tin plates andterne plates	125	253	5,982	3,743
Structural iron and steel	6,564	4,915	45,540	26,118
Wire	11,939	7,609	78,970	67,062
Cut nails.....	501	1,372	5,021	6,064
Wire nails.....	3,003	1,945	21,894	10,893
All other, including tacks	387	282	2,451	1,654
Totals.....	67,071	105,281	498,545	591,665

The imports for July were 36,444 gross tons, as compared with 40,385 tons in June and 37,420 tons in May. The details of such imports for the month and seven months are shown in the following table:

Imports of Iron and Steel.

Commodities.	July,		7 months ending July,	
	1905.	1904.	1905.	1904.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron.....	21,927	4,242	109,816	48,254
Scrap	147	314	7,916	8,894
Bar iron.....	3,383	3,115	10,143	13,111
Rails	202	3,581	9,898	34,028
Hoop, band and scroll ..	522	265	1,273	1,233
Billets, slabs, bars, &c. ..	2,364	879	7,970	7,492
Sheets and plates....	168	156	1,235	3,280
Tin plates andterne plates	4,705	734	40,732	42,115
Wire rods.....	1,095	1,428	9,151	9,516
Wire and articles made from	235	334	2,348	2,552
Structural iron and steel	1,664	355	3,064	5,800
Chains	18	23	153	242
Anvils	14	7	107	92
Totals.....	36,444	15,433	212,806	176,609

The total value of imports of all kinds of iron and steel, including manufactures thereof, but excluding iron ore, for the month of July was \$2,112,557, against \$2,646,258 in June. The total value of exports of similar commodities for July was \$11,036,843, against \$11,820,655 in June.

The United States has heavily increased its sales to Japan this year. Japanese reports for the first six months of 1905 show that imports from the United States in that period totaled \$31,921,000, as against \$13,328,000 during the same period of 1904; from the United Kingdom \$32,623,000, as against \$16,982,000; from British India \$34,034,000, as against \$21,092,000; from Germany \$10,794,000, as against \$6,985,000 for the same period of the year 1904. Imports from other countries have increased at a much lower rate or else show decreases.

American Machinery in the Philippines.

From an article by Frank L. Strong in the *Daily Bulletin*, Manila, P. I., for July 1, the following extracts are taken:

The Spanish policy offered no inducement to manufacturers aside from very restricted lines. The great tobacco manufactories which furnished revenue for the Government were well equipped with modern machinery. A large electric lighting plant supplied the city of Manila, a well equipped sugar refinery, various plants of rice machinery, a few saw mills, an occasional machine shop and a small amount of special appliances were found, but hand labor prevailed in nearly all lines. An extensive cotton factory was erected shortly before the Americans arrived, which, in the absence of sufficient native product, is obliged to import its raw material from abroad. Many distilleries, one brewery and a cocoanut oil plant with improved hydraulic machinery were found in Manila, and a shipyard with marine railway and repair shops at Cañacao. A railroad had been built from Manila to Dagupan, 118 miles, by English capital a few years before and its repair shops fairly well fitted with tools.

Americans were struck with methods of work as well as the obsolete machinery. The main lines of shafting at Cavite navy yard were run at 50 revolutions per minute and the tools correspondingly slow. An expensive French compound engine was seen in a saw mill running with a boiler pressure of 50 pounds. In another saw mill logs were being sawed in a mill whose feed motion was operated by a ratchet, said ratchet deriving its motion from the toe of a barefooted native.

In spite of adverse conditions, such as lessened crops owing to the cholera and death of draft animals, unsettled political questions and the onerous duty of 20 per cent. ad valorem on a large class of machinery, very great progress has been made. One result of finding a clear field with practically nothing modern is that the machinery now in operation is of the newest improved type and the best adapted for its purpose. Under appropriate heads some of the leading lines will be briefly touched upon. Many others could be mentioned.

Machine Shops.

The Navy Department early imported tools for Cavite and is constantly adding to its outfit, having now a creditable line of machinery for the repair of war vessels. Closely following, the army provided its own shops in Manila, all well fitted. The extensive fleet of coast guard vessels required its own shops, and Engineer's Island, at the mouth of the Pasig River, was devoted to that purpose by the Philippine Commissioners. Aside from the great shop buildings now completed, others are contemplated, which will make one of the most complete plants in the Orient. A few months ago a marine railway was installed, of the most approved design in the world and of American manufacture. Vessels of 1500 tons are drawn from the water and placed high and dry on a working platform in 15 minutes. A similar marine railway is now being erected at Cebu, having a capacity of 2000 tons, and machinery of the most approved American types is now in transit or equipping the expensive shipbuilding and repair shops connected with it.

The great \$1,000,000 floating dry dock ordered for the navy at Olongapoo will soon reach the islands and will readily dock the largest vessels in the world. Fully equipped shops will be erected in connection with it.

The old private shops in Manila and elsewhere have felt the new spirit and many tools have been installed and methods of work changed. Inquiries for shop tools are coming in from various parts of the islands slowly, enough to indicate that the new methods are steadily making themselves felt. The leading manufacturers of this class of machinery are represented here, and without the delay of correspondence with their home offices in the United States purchasers can readily make their selections.

Wood Working Machinery.

Very early in the occupation an enterprising American, finding Manila practically without this class of machinery and dependent upon Chinese hand labor, even to

the extent of sawing logs into boards, ordered an up to date saw mill and various machines for converting the boards into the finished product. His business has proved very successful, and many large contracts for public and other buildings have been filled.

Following soon after other mills were erected, and any class of mill work can be had, including furniture. Many mills have been placed in other parts of the islands, but the industry until recently has been heavily handicapped by unsatisfactory forest laws. Millions of feet of American lumber are constantly being imported into this country teeming with forests. Even Borneo is successfully competing in this market. These conditions will undoubtedly be changed soon.

Agricultural Machinery.

The wealth of the Philippines, as with most other countries, lies in its soil. No more fertile land lies under the sun, and it is doubtful if one can be found elsewhere where less has been done along modern lines. The Philippines Commission has wisely expended large sums to instruct the people. Large farms have been set aside for experimental purposes, scientific and mechanical experts have been brought from home, new products introduced and old ones carefully studied. Machinery approved by years of successful use at home has been placed in the various experimental farms and natives taught its use. Wealthy planters are taking vital interest in the new methods, visiting the Government farms and ordering similar outfits. Seeds are freely distributed, methods carefully explained, and the officials of this department through personal effort and published instructions are rapidly extending knowledge.

Steam plows have been successfully introduced in these farms, the two on the Murcia hacienda having recently finished plowing 1000 acres. Reapers, mowers, rakes, harrows and other machines are found on these farms, and purchases are being made by interested farmers. Last season the steam thresher at the Murcia hacienda was sent about the adjoining country and threshed some 40,000 bushels of rice. At first the natives refused to have their rice threshed with it, saying that such marvelous rapidity could only be accomplished by the devils the Americans had put inside the machine and that the rice would be poisoned. The superintendent ate of the rice in their presence and satisfied their fears, but they refused to plant the rice so threshed, as owing to the devils they still insist are in the machine they know it will not sprout.

The prevailing custom of dividing rice fields into very small units prevents the use of steam plows and harvesting machinery, but with the greatly lessened cost of production as shown on the Government farms the modern plan will soon prevail.

Plows and other implements drawn by animal power are gradually being introduced, and will ere long replace the crude home made affairs.

Road Making Machinery.

Almost destitute of common roads, the work undertaken directly by or under the auspices of the Government has been a stupendous one, and is being vigorously prosecuted. The highest grades of American machinery are being freely used.

Rock Crushing Plants.

At the Binangonan quarries the Government has two massive rock crushers capable of crushing over 100 tons of rock per hour. This rock is largely used for improving the streets of Manila, and is of the hardest quality. Other crushers are elsewhere in the islands providing solid ballast for the great Government roads.

Mining Machinery.

Owing to various causes the mining industries have scarcely opened as yet. Much prospecting has been done by private parties, and the well equipped Government Mining Bureau has added greatly to the information obtained from Spanish sources. There is every indication that gold bearing quartz deposits exist in paying quantities, and the importation of stamp mills and kindred machinery will soon be freely made. The deposits of base metals are very large, copper especially being found in great quantities, and it remains only to con-

struct roads to present inaccessible fields to develop an industry in which much machinery will be used.

Dredging, Pile Driving, Rock Drilling, &c.

The great work of making a new and safe harbor for Manila, involving an expenditure of several millions of dollars, has necessitated modern machinery. One of the largest sand sucker dredges in the world has been used in this work, its hourly capacity being a 30-foot cube of sand transferred from the bottom of the harbor to the shore. The contractors have complete equipments for pile driving, drilling, pneumatic riveting and various other operations pertaining to their business. Other contracting firms have imported considerable machinery of this class, and the demand for it is steadily on the increase.

Electrical Machinery.

A few years before the advent of Americans a lighting plant was installed in Manila, the machinery coming from one of the best known United States houses. Some four years ago this plant was doubled in capacity. Within a few months an entirely new plant has been put in operation providing power for a strictly modern street car system, and both plants are now consolidated under one ownership, furnishing power and light as well for private parties and for Government purposes. Nowhere in the world can be found a more complete electrical plant, the very latest improvements being embodied in its design, even to the extent of the generators being operated by steam turbines.

Electricity is rapidly being introduced in various other cities for lighting and power, and many private and Government shops in Manila are importing direct driven tools. Surveys have been made with a view to utilizing an excellent waterfall found in an adjoining province, transmitting its power electrically to Manila. Other water power abounds in the islands. The leading electrical houses in the United States are represented here by competent men, and it is safe to assume that this line of machinery will have extensive sale in the future. The recent change in the tariff which imposes a duty of but 5 per cent. on this class of machinery will stimulate its introduction.

Ice Making and Refrigerating Machinery.

But two small plants were in operation when Americans arrived, one manufacturing ice and one for cooling purposes in a brewery, both in Manila. Almost with the first transport bringing volunteer troops the ladies of the Red Cross in San Francisco sent out a small ice machine which was erected at Cavite. It proved an untold blessing to the sick and a luxury to the well. The idea was followed later under army auspices, something like 30 of these small plants being distributed about the islands for the use of the troops.

Very soon after sending troops here the home government undertook the stupendous task of supplying them with fresh meat and vegetables. No nation on earth had ever before so jealously guarded the health and ministered to the comfort of its soldiers. Located in the heart of the city of Manila, this beautiful building forms a stately monument to the care of the nation for those fighting its battles. Equipped with the highest grade of machinery known and developing a duty equal to the melting of 300 tons of ice per day for preserving meats, and also for manufacturing 50 tons of chemically pure ice per day, this great plant receives its capacious store-rooms whole shiploads of fresh beef from Australia and distributes it all over the islands.

The private ice plant of Manila has been increased to a capacity of 75 tons per day, and the former little 10-ton machine of the San Miguel Brewery has been replaced by one of 200 tons daily capacity, being the largest single unit machine in the Orient. Various small private plants have been erected elsewhere in the islands, and a steady growth of this class of machinery is assured.

Printing and Lithographing Machinery.

The many tobacco factories early called for lithographing work for cigar box labels, and several German firms were found when Americans arrived, all doing excellent work with improved machinery. Ordinary printing for newspapers, books, &c., was so wretchedly done

as to make one wonder why their reader did not grow blind. Very early an American skilled in the business opened an office, bringing improved machinery and competent assistants. His plant has grown to be by far the most extensive in the country, and the work produced is equal to anything that can be found in the States.

American newspapers were published very early in the occupation, and in some offices are to be found the highest grades of machinery, one even being equipped with typesetting machines.

Manual Training Schools.

Much has been written covering the great work of education the Government is doing in the Philippines and too much cannot be said in its praise. Little is known of the work done in one branch of education which all friends of the people should watch with absorbing interest. The native is not naturally a mechanic, and worse, the better class of natives have been taught that it is degrading to work with their hands. I confess that when first called upon to equip the Manila Trade School with a machine shop and wood working outfit I felt that it probably would be money thrown away. Three years have passed, and some hundreds of boys have passed and are passing through this model school. Their absorbing interest in their work, their intelligent appreciation of the uses of their tools and the very creditable articles turned out have settled the question as to where the future superintendents and foremen of the country are to come from. The dignity of labor is a hard question for even Americans to settle, but the Filipino is learning it, even as we have had to. It is gratifying to know that from the Commissioner of Education down to the teachers all have recognized the all important value of the trade school and that more are being established, giving every facility to students to acquire useful trades.

Looking back over the very few years since American occupancy, remembering my feelings when first we were permitted to examine a country all new and strange, appealing to the ludicrous side of one's nature when machinery was seen, the change already wrought seems marvelous. But a beginning only has been made. Railroads will soon open up the land, the persistent work of the Agricultural and Mining bureaus is already being felt and will soon become a power and machinery will more and more be called for. The ill-advised tariff of the past has been so modified that the purchaser's burden has been lightened, the observations of the honorary commissioners made in the United States as to machinery is the common talk among the educated Filipinos, and machinery will come because it must. With its coming the Filipino youth is being taught its use in his trade school, and should the hopes of his teachers and friends be fulfilled he will forever settle the question as to whom we can get to operate the machines we bring.

The development of the producer gas plant has been given considerable attention in Europe, and some results of the use of such plants, given in the *Engineer*, London, are of interest. One user finds that his fuel cost for an 8 horse-power engine amounts in 64 hours to \$1.31; this figures out at \$0.0026 per horse-power-hour. In another case the working cost for a 22 horse-power engine is \$0.80 per day (hours not given). Assuming ten hours, this becomes \$0.0037 per unit. In a third case a 22 horse-power oil engine, costing \$2.80 per day, was replaced by a 25 horse-power engine running with producer gas, by means of which the daily running expenses were reduced to 60 cents. In all of these cases Anzin coal or anthracite was used.

According to the Monthly Summary of Commerce and Finance, published by the Department of Commerce and Labor, Milwaukee leads all other ports on the Great Lakes for registered tonnage during the first six months of the present year. The ten ports having an aggregate registered tonnage for the first half of the year of 16,572,042 tons are in their order of volume as follows: Milwaukee, Chicago-South Chicago, Duluth, Buffalo, Cleveland, Two Harbors, Superior, West Superior, Ludington, Ashtabula, Escanaba.

PERSONAL.

Leonard Peckitt of Catasauqua, Pa., president of the Empire Iron & Steel Company and of the Sheffield Steel & Iron Company, has returned from Europe.

J. A. Murray, formerly of the Peckham Mfg. Company, Kingston, N. Y., has been appointed to act as Eastern manager for the Ajax Mfg. Company during the absence of I. H. Pratt, who is now in Europe. Mr. Murray will make his headquarters in the office occupied by Mr. Pratt, at 149 Broadway, New York.

Joseph A. Rothwell has been appointed superintendent of the Pioneer Iron Works, Brooklyn, N. Y.

E. G. Toot recently resigned as superintendent of the engine department of the Chicago plant of the American Shipbuilding Company and has been elected vice-president and general manager of the Gunnell Machine Company, Manitowoc, Wis., successor to the Gunnell Tool Company.

G. C. Shade, vice-president and general manager of the Braddock Machine & Mfg. Company, Braddock, Pa., terminated his official connection with the company on August 31 and for the present will not engage actively in business.

H. P. North became connected on September 1 with Weston Donaldson, 421 Chestnut street, Philadelphia, dealer in iron and steel scrap. For the past three years Mr. North has been with Pilling & Crane, Philadelphia.

R. N. Dickman of Chicago has recently been inspecting iron ore properties in Madera County, Cal., for the Southern Pacific Railroad.

R. A. Hadfield of Sheffield, England; Professor Turner of Birmingham, A. H. Sexton of Glasgow, and Dr. Richard Moldenke of Watchung, N. J., secretary of the American Foundrymen's Association, were elected honorary members of the British Foundrymen's Association at its recent meeting in Glasgow.

The announcement is made that President Alfred J. Major of the American Bridge Company will hand in his resignation at the forthcoming meeting of the directors on September 21. It is understood that his successor will be August Ziesing, Western manager of the company, with headquarters at Chicago. President Major resigns on account of his health, proposing to take a rest from a long period of intense application to business.

W. H. Squire, formerly with the American Tool Works Company, Cincinnati, and the McConway & Torley Company, Pittsburgh, who has been traveling and studying in Europe since 1901, has been appointed assistant to the Administrateur-Directeur of the Société Anonyme Hotchkiss, builder of the Hotchkiss cannon and automobile, and is stationed at the general offices, 21 rue Royale, Paris.

A. M. Castle of Chicago, H. E. and W. E. Derbyshire, Chambersburg, Pa., and Robert A. Bole, Pittsburgh, who sailed for Europe July 27, have just returned after making a tour of England, France, Germany, Switzerland and Holland.

Frank A. Le Clerq, general manager of the plant of the American Radiator Company, at Litchfield, Ill., has been given a six months' leave of absence, owing to poor health, and has gone to the Adirondacks. G. R. Corwin of Titusville, Pa., will have charge of the Litchfield plant for the present. Mr. Le Clerq was for six years in charge of the Standard plant of the American Radiator Company and was also at one time connected with the M. Steele Company, Springfield, Ohio, which was later taken over by the American Radiator Company. Previous to his departure for the Adirondacks the employees at the Litchfield plant presented him with a diamond ring.

Additional changes among officials have been announced by the Carnegie Steel Company, Pittsburgh, as follows: W. I. Dithridge, assistant cashier, has been appointed cashier, vice F. A. McCune, resigned, and John W. Brandon has been appointed assistant cashier to succeed Mr. Dithridge.

E. G. Spillsbury, consulting engineer, 45 Broadway, New York, has just returned from an extended trip through northern California and New Mexico, where he went in the interest of the various copper mines

for which he acts as consulting engineer. Mr. Spillsbury reports copper mining interests in a very prosperous condition.

Joseph A. Thompson, formerly manager of the Standard Engineering Company, Ellwood City, Pa., has resigned to accept the position of general superintendent of the New Castle Forge & Bolt Company, New Castle, Pa., with entire charge of the operating end.

Harry F. Mattern has been elected vice-president of the Lebanon Chain Works Company, Lebanon, Pa., after serving for some time with the American Iron & Steel Mfg. Company as superintendent of a department.

B. H. Warren has decided to retire from the presidency of the Allis-Chalmers Company, Milwaukee, and it is said that he will become the head of a new engineering and contracting company in New York.

Among the recent arrivals from Europe are H. C. Frick, George Westinghouse, F. A. Heinze, Charles A. Schieren and Oliver Wren.

Richard Peters, Jr., has resigned as secretary and treasurer of the Solid Steel Casting Company, Chester, Pa., to become connected with the Georgia Iron & Coal Company at its Rising Fawn Furnace, Rising Fawn, Ga.

NEWS OF THE WORKS.

Iron and Steel.

It is reported that the Turner, Vaughn & Taylor Company, Cuyahoga Falls, Ohio, which recently sent a complete wire mill to Japan, is at the present time very busy constructing several improved wire mills, one of which will be located in Atlanta, Ga.; one in Peoria, Ill., and one in St. John, N. B., also the Montreal Rolling Mill Company, which is enlarging its outfit with some new machinery. Various orders for part equipments are being filled, together with a line of sewer pipe machinery of its special style.

The Midland Steel Company, Pittsburgh, recently organized with a capital of \$3,000,000, is building a blast furnace 23 x 85 feet near Beaver, Pa., on the main line of the Cleveland & Pittsburgh Railroad, which it proposes to operate on a high grade foundry iron. Later on the company proposes to add one or two more blast furnaces and possibly build an open hearth steel plant.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, has orders for hollow staybolt iron bars for export to the Imperial Railway of North China and a leading railway of Japan.

The Cambria Steel Company, Johnstown, Pa., is now turning out an average of 15 steel cars per day, but it has been making extensive additions to its equipment, which will be completed in two or three weeks, when it will be able to turn out from 25 to 30 steel cars per day.

The petition of A. F. Baumgarten of Pittsburgh against the Maryland Rail Company, Cumberland, Md., was dismissed on September 1 and the matter closed.

One Carrie furnace and one Duquesne furnace of the Carnegie Steel Company have been blown out for relining and repairs. Some excellent records for output are being made by the company's Clairton stacks.

The Struthers Furnace Company, operating a blast furnace at Struthers, Ohio, is building 160 beehive coke ovens at Salem, Pa. The report that the company would build one or two more blast furnaces at Struthers is officially denied.

General Machinery.

The Baxter D. Whitney Company, Winchendon, Mass., manufacturer of wood working machinery, will build an addition to its machine shop, to be 30 x 40 feet.

The London branch of the Buffalo Forge Company, Buffalo, N. Y., has procured a very interesting order for heating and ventilating the various buildings of His Majesty's dockyards at Portsmouth. There are seven separate plants, each involving the same capacity of apparatus and of large size. The engineers of the Buffalo Forge Company's London office in studying the requirements and existing conditions of the buildings decided upon the use of fans especially designed therefor. Likewise the 56 heaters to be used in the installation are of special construction.

Application has been made for the appointment of a receiver for the American Machine Company, Erie, Pa. The liabilities are given as \$96,780, and the assets, including \$591,000 for patent rights, are given as \$620,000.

The International Electric & Mfg. Company was organized August 21 at Milwaukee, Wis., with a capital stock of \$300,000. The company proposes to take over the option of the Milwaukee Engineering Company on the plant and business of the Milwaukee Electric Company at West Allis, which discontinued active business last year. The object of the company is the manufac-

ture of electric machinery of all kinds, gas and gasoline engines, steam boilers and engines, switchboards, telephone and telegraph instruments, water and electric meters, also a full line of street railway motors, alternators and rotaries. The plant of the company is well constructed and equipped with machinery, and it is expected that the new company will be able to commence business within the next 30 days. The company is to pay the Milwaukee Engineering Company \$150,000 for its option on the plant.

The Lima & Toledo Traction Company, Lima, Ohio, will probably in the near future build car shops, express depot and additional barn room in Lima. Details of the buildings and their equipment have not yet been determined upon.

The Robins Conveying Belt Company, Park Row Building, New York, is about to complete several large export shipments of belt conveyors intended for lead works in Belgium. It is also constructing a conveyor and elevator for the Union Fuel Company, San Francisco, and two belt conveyors for the Cranberry Furnace Company. The storing and reclaiming bridge which the Robins Company is erecting at Milwaukee for the Semet-Solway Company is about ready to operate and will probably handle coal early this month.

The Canada Machinery Company, Limited, Sarnia, Ont., whose plant was recently destroyed by fire, will in all probability rebuild, but not on the present site. The loss by fire is estimated at \$80,000. The management of the plant was recently changed and is now in the hands of W. F. McGuire and C. B. Richards, formerly of Cleveland. The plant was erected in the first place by J. L. Board of G. A. Crosby & Co., Chicago, manufacturers of can making machinery, taken over by the American Can Company. The output of the Canada company comprises can making machinery, lathes, shapers, planers, drills and presses of all kinds.

The business of M. H. Brigham Company, 63 Haverhill street, Boston, Mass., engineer and machinist, manufacturer of gasoline engines and dealer in new and second-hand machinery, has been incorporated under Massachusetts laws with a capital stock of \$10,000. Charles C. Stanchfield is the president and M. H. Brigham the treasurer.

The Green Compressed Air Company, Camden, N. J., which was recently incorporated with a capital stock of \$300,000, has not yet decided whether it will take over an existing machine shop or build a new one for the manufacture of its products, which include Green air compressors and compound air pumps. The company will use the shops of E. Maerky, Philadelphia, temporarily and may possibly absorb that plant. Thomas R. Green is president, H. A. Reier secretary, and Emil Maerky treasurer.

Foundries.

The plant of the American Foundry & Machine Company, at Ravenna, Ohio, has been bought by Albert C. Hays and others of Pittsburgh, who propose to operate it.

The Oregon Foundry & Machine Company, Oregon, Ill., has increased its capital to \$20,000 in view of greatly increased business, and has placed orders for new equipment, consisting of a 64-inch boring mill, several lathes, shapers, drills and other tools.

The Worcester Steel Foundry Company, Worcester, Mass., has been incorporated under Massachusetts laws with a capital stock of \$300,000, to conduct the steel foundry business located at Millbury, a suburb of Worcester. The officers of the company are: President, J. O. Emanuel Trotz; treasurer, W. H. Cook; clerk, Edgar Whidden, all of Worcester. Mr. Trotz is one of the best known of the world's steel experts. He was formerly head of the steel plant of the Worcester works of the American Steel & Wire Company, and before the Washburn & Moen Mfg. Company went out of existence held the same position in these works. He was later superintendent of the great South Works at Worcester, and afterward became an expert metallurgist of the United States Steel Corporation. Mr. Trotz will give personal supervision to the Worcester Steel Foundry Company's steel manufacture. William Pestell, recently with J. G. White & Co., New York, street railway contractors, will be the manager of the business, giving to it his entire attention. One of the company's specialties is a bond for street railway use, a field with which Mr. Pestell is very familiar. A general steel casting business will be carried on. Mr. Cook is the manager of the business of the George C. Whitney Company, Worcester, manufacturer of valentines. The company is at present extending its facilities for manufacture, as already noted in *The Iron Age*, and it is expected that greater improvements will be made later.

The business of the Ellis Foundry Company, South Carver, Mass., manufacturer of Arbutus ranges, parlor heating stoves and hot air furnaces, has been closed out. This is one of the oldest foundries in America, having been established in 1757, and has been in practically continuous operation ever since. It is claimed that the first tea kettle ever cast in this country was made at these works. For many years it was the most prominent hollow ware foundry of New England. Furnaces and ranges have been manufactured in recent years. The Le Baron Foundry Company, Middleboro, Mass., has purchased a part of the flasks and patterns.

Chas. Sodermann, president of the Sodermann Heating & Power Company, St. Louis, Mo., announces that a foundry for

the manufacture of radiators and other castings in connection with a boiler plant will be soon established in Edwardsville, Ill. The company has purchased 3 acres of ground, upon which it will erect the plant, specifications for which have been prepared. The contract for the construction of the buildings will shortly be let.

The Fort Pitt Malleable & Grey Iron Company, McKees Rocks, Pittsburgh, maker of malleable iron castings, has recently completed the building of a new pattern shop and pattern storage warehouse. There is also under way a building 50 x 150 feet, which will be used as a corerom, the additional space allowing the company to increase its capacity to 10,000 tons of malleable castings annually.

The offices of the General Castings Company have been removed from 911 Farmers Bank Building, Pittsburgh, to the works at Verona, Pa., near Pittsburgh, where the company has completed the building of a plant for the manufacture of steel castings of every description.

Among the most active iron and steel trades in the Birmingham district, Alabama, the cast iron pipe manufacturers are enjoying a most prosperous time. The various plants in the district are just as busy as they can be with a number of good orders on hand and more in sight. The United States Cast Iron Pipe & Foundry Company has just completed large additions to its plants at Bessemer and North Birmingham, and during the next few days the new departments will be started up. The Dimmick Company has started the machinery in its new addition and expects to make the largest sized pipe ever manufactured in the South within the next few days. The plant has practically doubled as to capacity.

Bridges and Buildings.

The Kenwood Bridge Company, Chicago, has recently taken contracts for structural work aggregating nearly 1500 tons. The more important of these are as follows: Hegeler Brothers' Chemical Works, Danville, Ill., three buildings, 500 tons; power house for the Pullman Company, Chicago, 400 tons; 200-foot extension for the Standard Forging Company, Indiana Harbor, Ind.; power house for the South Side Elevated Railroad Company, Chicago, 800 tons, together with a number of crossings for the same road.

The Ward-Somerville Company, Pittsburgh, has been organized with a capital of \$12,000 for the manufacture of structural iron and steel and ornamental bars, bronze and iron work. Frederick W. Ward, Sewickley, Pa., is actively interested in this company.

Sealed proposals will be received by M. A. Przybylowicz, City Clerk, Leavenworth, Kan., until September 6 for the construction of a steel bridge at Eighth and Shawnee streets, to cost \$5874.49.

Power Plant Equipment.

The Westinghouse Electric & Mfg. Company, Pittsburgh, Pa., has received contracts for the equipment of about 12 different electric railway lines with its single phase alternating current system, said to be the latest development of electric traction. The first of these roads began operations in Indianapolis last April. The best evidence of the success of the new system lies in the fact that most of the early roads have ordered additional equipment from the Westinghouse Company. The demand for electric railway motors and generators has never been larger than at present, and the railway department of the Westinghouse works at East Pittsburgh is kept busy night and day filling orders.

The Livingston Water Power Company, Livingston, Mont., has begun the erection of a new power station, 60 x 100 feet, two stories in height. Foundations will be provided for 4750 kw. in generators and four 1325 horse-power water wheels. There will be installed between now and November 1 a 1750-kw. General Electric machine and a 1325 horse-power Leffel water wheel, both of which have been contracted for.

The Chase Engine Mfg. Company, Shelbyville, Ill., at a recent meeting of its stockholders decided to expend from \$15,000 to \$18,000 in an addition to the plant and the installation of new machinery. The equipment has been purchased and improvements are now under way. These extensions are the outcome of a demand exceeding the present facilities of the plant.

The Berridge Shear Company, Sturgis, Mich., has begun the erection of a two-story building, 50 x 100 feet. The company is in the market for electric equipment, gas engine outfit and hot air fan system heating apparatus.

Electrical equipment for the power plant of the Spring River Power Company, which will be located at Varch, Kan., includes one of the 2000-kw. Westinghouse units installed at the Louisiana Purchase Exposition, together with accessories, and 2400 horse-power of Haine boilers. The Arnold Company, Chicago, is engineer in charge of the project. The equipment named has already been purchased.

The Citizens' Electric Light & Ice Company, Lebanon, Ind., has installed two Diesel engines, one of 400 horse-power and the other about 200 horse-power capacity. The larger of the two engines was employed at the St. Louis Exposition for furnishing light and power for the Tyrolean Alps, one of the concessions on the Pike. Each engine is direct connected to a 60

cylinder revolving field type General Electric generator of 2300 volts.

Ashurst Pressed Drill Company, Havana, Ill., which has heretofore devoted itself exclusively to the manufacture of marine and stationary gas engines and friction clutch pulleys, has reorganized as the Havana Mfg. Company and is laying plans for enlarging and improving its facilities for supplying its increasing trade. The stock formerly owned by John E. Meyer has been sold to W. A. Henninger and that owned by H. G. Bruning has been purchased by C. P. King. N. C. King and H. J. Phelps, both large stockholders in the Havana Metal Wheel Works, have also taken an interest in the company.

Fires.

The hammock factory of the Joseph H. Masland Company, Germantown, Philadelphia, Pa., was entirely destroyed by fire on the night of the 4th inst.

Hardware.

The Avery Stamping Company, Cleveland, Ohio, manufacturer of Never Break steel cooking utensils and shovels, with a plant also for doing its own tinning of kettles, has lately fitted up to do all kinds of retinning of steel, malleable iron, brass and copper, but not cast iron, for outside parties.

An indication of the general condition of business may be had from the fact that the International Silver Company, Meriden, Conn., began operating its Factory E 59 hours a week early in August, a rush of orders making it necessary to begin the winter schedule at midsummer. This is a very unusual condition of affairs at the plant.

J. S. Lehnar, manufacturer of lawn swings, stepladders, &c., Austell, Ga., contemplates removal to a plant already constructed at Meridian, Miss., where it is proposed to install machinery for the manufacture of his line.

J. C. Rogers, L. O. Greene and others, of Albert Lea, Minn., will organize a company for the manufacture of the De Vaux metallic refrigerator at that place.

The Best Ammunition Company, Cromwell, Conn., has been incorporated with a capital stock of \$50,000, to manufacture a new patented nonmercurial primer for all powders and cartridges and a new patent shot shell, to be put on the market both empty and loaded. The incorporators are Charles P. Frisbee and Charles A. Bailey, Cromwell, and Lyman D. Mills, Middletown, Conn. The company will begin manufacturing as soon as new automatic machinery is ready.

The recent fire at the Michigan Washing Machine Company's plant, Muskegon, Mich., simply destroyed the wood work, which is now being replaced. The company expects to resume operations with a full crew about September 15.

The Boston Bolt Company, Boston, Mass., has taken a lease for 20 years of a manufacturing plant on Farnsworth street, South Boston. The building covers about 20,000 square feet of ground.

The North Wayne Tool Company, manufacturer of edge tools, North Wayne, Maine, is to begin work immediately on its new factory, which will replace that recently destroyed by fire. The principal buildings will be 42 x 167 feet and 42 x 147 feet. The machinery has been contracted for.

The first run of the new foundry of the Gray & Dudley Hardware Company, Nashville, Tenn., was made last week in the presence of the Board of Directors of the company and a large number of invited guests. The foundry was pronounced to be an excellently designed plant. Souvenirs in the form of miniature griddles were given to the visitors. The plant will employ 125 men at present. Hollow ware and castings of various kinds will be made by the company, stoves being a specialty. The company expects to turn out its first stove early in September.

Miscellaneous.

The Forsythe Pattern Company, Youngstown, Ohio, originally incorporated under the laws of Delaware, has had that incorporation dissolved and reincorporated under the laws of Ohio, with a capital stock of \$50,000. At a meeting of the directors recently the following officers were elected: Frank D. Runser, president and manager; George J. Renner, vice-president; E. H. Arnold, secretary, and John Stambaugh, treasurer.

The International Flax Twine Company, St. Paul, Minn., has been organized with a capital stock of \$250,000 by directors of the International Harvester Company. The company will remodel and utilize the entire Minnie harvester plant for the manufacture of flax binder twine, which will permit of a very large output. This move represents a change in the former plans of the International Harvester Company, which contemplated the establishment of a number of small mills scattered throughout the flax producing sections.

The citizens of Marinette, Wis., have voted favorably on a proposition to bond the city for \$100,000 to buy factory sites and offer inducements to new industrial concerns to locate there. The bonds will be issued at once, and the Chamber of Commerce will commence a campaign with a view to inducing manufacturing concerns to locate at Marinette. The first thing the city proposes to do is to purchase 30 acres of river frontage for factory sites.

The Henning Mfg. Company, Minneapolis, Minn., will erect a new plant for the manufacture of steel ceilings, cornices, sky-

lights and similar products. The company was recently incorporated to succeed J. Henning.

The Fort Smith & Western Railroad Company, of which A. C. Dustin, Cleveland, Ohio, is president and treasurer, expects to build 100 more coke ovens this fall at McCurtain, I. T. The company already has 108 ovens in operation. These coke fields are of great importance to the iron industry, in view of large and valuable iron ore deposits in Llana County, Texas.

The Klechler Mfg. Company, maker of sheet metal products, Cincinnati, Ohio, has purchased a large tract of land in Winton place, near the Mitchell avenue crossing of the Baltimore & Ohio Southwestern tracks. The company will erect thereon several modern factory buildings, but it will be several months before particulars in reference to the new plant can be given.

The Duplex Mining & Milling Company, Searchlight, Nev., a partnership formed by G. V. Coltor and Alfred Leigh Glassell of Los Angeles, Cal., intends building a new cyanide plant this fall.

The Sherwood Mfg. Company, Buffalo, N. Y., manufacturer of fine brass goods, is planning an extensive addition to its plant. This concern has built up a large foreign trade and has just completed a large order for shipment to Bombay, India, and another for London.

The Standard Welding Company, Cleveland, Ohio, is erecting a new factory building, 60 x 160 feet, costing \$100,000. The building will be equipped with electric welding machines and special forming apparatus, the machinery being driven by a 50 horse-power motor. Most of the machinery has been purchased or is in course of construction at various factories from designs furnished by the company.

The style of the Bilson-Henriksen Mfg. Company, 15 West Madison street, Chicago, has been changed to the C. H. Bilson Company and the capital stock increased from \$10,000 to \$20,000. The company manufactures the Bilson quick return pump and the Standard stock farm engine.

The business of Alger & Macfarlane, 14 Oliver street, Boston, Mass., contractors for ventilation and sheet metal work, has been incorporated in Massachusetts with a capital stock of \$15,000. Charles W. Alger, the president, will have charge of the construction and manufacturing end of the business, and Duncan Macfarlane, Jr., the treasurer, will look after the finances and buying interests of the company. These gentlemen with Robert E. Goodwin constitute the Board of Directors.

The business of John L. Parker & Co., Worcester, Mass., manufacturers of seamless sheet metal goods, has been incorporated under Massachusetts laws with F. R. Jones as president and John M. Kendall as treasurer. Edmund L. Parker, who has conducted the business for a number of years, retires from the management. The business was established in 1869.

The Johns-Pratt Company, Hartford, Conn., manufacturer of electrical supplies, is contemplating making material improvements to its factory, comprising raising two of the present buildings another story. No definite decision has been made as yet.

The American Coil Company, West Somerville, Mass., manufacturer of ignition apparatus, sparking plugs, induction coils and other electrical apparatus, is to remove its business to Foxboro, Mass., where a new factory will be erected, 25 x 45 feet and two stories. Power will be provided by a gasoline engine.

The Calumet Supply Company, 411-413 Dearborn street, Chicago, Ill., has been organized for the purpose of jobbing mill, factory and railroad supplies, power plant and factory equipment, as well as small tools and hardware specialties for engineers, mechanics and carpenters. This company has already secured the exclusive agencies in Chicago for several representative manufacturers of steam pumps, feed water heaters, lubricator pumps and engine room specialties, and requests correspondence with manufacturers who are looking for selling representatives in Chicago and the Western territory. The officers of the company are: J. E. Ward, president and general manager; Frank M. Gilmore, vice-president, and A. J. Petit, secretary.

The Stanton Mfg. Company, Roselle Park, N. J., will occupy a new plant for the manufacture of automobiles. M. K. Willoughby is president; A. C. Stanton, vice-president; F. Southmade, secretary and treasurer.

L. O. Koven & Bro., Cliff street, New York, are having plans prepared for an addition to their galvanizing plant, which is expected to be ready for operation in about six months.

The Providence Engineering Works, Providence, R. I., has been awarded the contract from the Maxwell-Briscoe Motor Company, Tarrytown, N. Y., for 2500 engines and rear axles for its automobiles.

The A. C. Stiles Metal Company, New Haven, Conn., manufacturer of locomotive and car journal bearings, has changed its name to the A. C. Stiles Anti-Friction Metal Company, and has voted to increase its capital stock from \$100,000 to \$200,000.

The Alabama Steel & Fuel Company, with J. M. Overton, a Nashville capitalist, president, has been organized in the Birmingham district. H. F. De Bardeleben, one of the best known of the pioneer wealthy men of the Birmingham district, is also a member of the company. The new corporation has immense bodies of coal lands in St. Clair County, Alabama, and a branch track to its properties is now being constructed by the Central of Georgia Railroad. Present plans look to an output of over 2000 tons daily.

The Iron and Metal Trades

The feature of the market during the past week has been the heavy buying of Steel Rails for 1906, notably on the part of the Western lines. It is estimated that the total sales foot up to fully 250,000 tons. Among the large orders are 70,000 tons for the Chicago & Northwestern, 55,000 tons for the St. Paul and 50,000 tons for the Chicago, Burlington & Quincy. In the South the Atlantic Coast line has taken 15,000 tons, while the Tidewater Railway has ordered between 8000 and 10,000 tons and the Reading road 15,000 tons. It is understood that during the next two weeks the requirements of the Pennsylvania and the New York Central roads will be brought out.

Further heavy equipment orders have been placed, the Pennsylvania leading with over 16,000 Steel cars. Among the orders to be placed is a lot of 1000 Steel cars for the Lake Shore & Eastern, controlled by the Steel Corporation.

The activity in nearly all lines of Finished Material is evidenced by the fact that the orders booked by the Steel Corporation for August make that the record month. The pressure which caused the advance in the price of Structural Material from 1.60c., base, Pittsburgh, to 1.70c. last week is expected to lead to a like advance in the price of Plates at an early date. Angle Bars have been put up to 1.50c., Pittsburgh, and some makers of Iron Bars are holding out for higher figures.

From Cleveland comes the news that contracts have been let for two additional ships, and it is reported that two Ore vessels of exceptional size are to be given out at an early date.

In the Pipe trade the principal item of interest has been the placing of an order for 60 miles of 18-inch Pipe by the Ohio Fuel Supply Company. A smaller order placed is for 15 miles of 10-inch Pipe.

In the Pig Iron trade it is worthy of note that there has been some contracting for foreign Iron. A tide-water Steel plant has purchased a lot of English Bessemer, the exact quantity not being known, while a large maker of Cast Iron Pipe has bought a round lot of Middlesbrough Pig. In both these cases the Iron is to be used to cover export orders for Finished product. A serious effort was made to compete with foreign Iron for domestic orders for Low Phosphorus Pig, but the business was taken by home furnaces. Sales aggregate about 15,000 tons of Iron of this character at \$20.50 to \$20.75, about one-half going to a large New England Wire plant and the balance to Steel works in eastern Pennsylvania.

So far as Bessemer Pig is concerned, it is quite evident that the Steel Corporation will probably need additional quantities of outside Iron. There have just been ordered into blast the Niles, Columbus and Riverside furnaces, so that every stack belonging to the Steel Corporation is now on the active list with the exception of Zanesville. Of course from time to time furnaces must blow out for repairs. Thus one Duquesne has just stopped and one Carrie is expected to blow out.

For early delivery there is a fair activity in Foundry Irons, but there is no general movement as yet to contract for delivery during the first part of 1906. There is some maneuvering going on, with the conflicting reports which usually characterize such a period. Furnacemen, particularly in the East, complain of high costs, while in the West the specter of a car shortage is again appearing. It has already begun in the Chicago district and there are signs of its coming in the Pittsburgh district.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type,
Declines in Italics.

At date, one week, one month and one year previous.

Sept. 6, Aug. 30, Aug. 9, Sept. 7,
1905. 1905. 1905. 1904.

PIG IRON:

Foundry Pig No. 2, Standard, Philadelphia	\$16.25	\$16.25	\$16.25	\$14.25
Foundry Pig No. 2, Southern, Cincinnati	14.25	14.50	14.50	12.00
Foundry Pig No. 2, Local, Chicago	16.25	16.25	16.25	13.50
Bessemer Pig, Pittsburgh	15.60	15.35	15.10	12.60
Gray Forge, Pittsburgh	14.50	14.35	14.40	11.60
Lake Superior Charcoal, Chicago	16.50	16.50	17.00	14.75

BILLETS, RAILS, &c.:

Steel Billets, Pittsburgh	25.00	24.00	24.00	20.00
Steel Forging Billets, Pittsburgh	20.00	27.00	26.00	....
Steel Billets, Philadelphia	27.00	27.00	26.50	22.50
Steel Billets, Chicago .....	....	29.00	28.00	20.00
Wire Rods, Pittsburgh	31.00	31.00	32.50	26.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00

OLD MATERIAL:

O. Steel Rails, Chicago	14.50	14.50	14.00	10.50
O. Steel Rails, Philadelphia	16.00	16.00	16.00	....
O. Iron Rails, Chicago	20.00	20.00	19.00	16.00
O. Iron Rails, Philadelphia	22.00	20.50	19.50	15.50
O. Car Wheels, Chicago	15.50	15.50	14.75	11.00
O. Car Wheels, Philadelphia	15.50	15.50	15.00	12.00
Heavy Steel Scrap, Pittsburgh	15.50	15.00	15.00	11.50
Heavy Steel Scrap, Chicago	14.00	13.75	13.00	....

FINISHED IRON AND STEEL:

Refined Iron Bars, Philadelphia	1.63½	1.63½	1.63½	1.48½
Common Iron Bars, Chicago	1.65	1.60	1.55	1.35
Common Iron Bars, Pittsburgh	1.65	1.60	1.60	1.25
Steel Bars, Tidewater	1.64½	1.64½	1.64½	1.45
Steel Bars, Pittsburgh	1.50	1.50	1.50	1.30
Tank Plates, Tidewater	1.74½	1.74½	1.74½	1.53½
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.40
Beams, Tidewater	1.89½	1.89½	1.74½	1.53½
Beams, Pittsburgh	1.70	1.70	1.60	1.40
Angles, Tidewater	1.89½	1.89½	1.74½	1.53½
Angles, Pittsburgh	1.70	1.70	1.60	1.40
Skelp, Grooved Steel, Pittsburgh	1.50	1.50	1.50	1.30
Skelp, Sheared Steel, Pittsburgh	1.55	1.55	1.55	1.35
Sheets, No. 27, Pittsburgh	2.20	2.20	2.20	2.00
Barb Wire, f.o.b. Pittsburgh	2.25	2.25	2.25	2.05
Wire Nails, f.o.b. Pittsburgh	1.80	1.80	1.80	1.60
Cut Nails, Mill	1.60	1.60	1.65	1.60

METALS:

Copper, New York	16.25	17.00	15.75	12.62½
Spelter, St. Louis	5.65	5.55	5.65	4.92½
Lead, New York	4.85	4.80	4.60	4.20
Lead, St. Louis	4.77½	4.77½	4.60	4.10
Tin, New York	32.70	33.00	32.50	27.50
Antimony, Hallett, New York	14.00	14.50	14.50	7.00
Nickel, New York	40.00	40.00	40.00	40.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	3.74	3.74	3.74	3.49

Chicago.

FISHER BUILDING, September 6, 1905.

Structural Shapes at the advance of \$2 a ton seem to be in as keen demand as at the old price and just as hard to get with any degree of promptness. Pig Iron is in *statu quo*, the general condition being a deadlock between buyers and sellers on the matter of 1906 Iron. Interests that have tested the market for first and second quarters of 1906 have encountered a wide diversity of ideas on the part of sellers. Of the latter the stronger have been willing to lose business that would not pay 50c. premium over present prices, while some of the weaker producers have been willing to name present figures for delivery up to July, 1906. Quite some tonnage has already been placed on the basis of \$11.75, Birmingham, for delivery the first half and first quarter of 1906, and one rather large Southern producer is spoken of as having taken everything offered it on the \$11.50 basis for an Iron a little higher in phosphorus than the Birmingham standard. Plates are supposed to be in line for an advance to the new 1.70c. basis set by Structural Shapes, but the situations are not quite analogous, as there are still large Plate producers who are able and willing to make prompt shipments on the 1.60c. basis. Steel Bars are, if anything, stronger than Plates in the matter of supply and demand, because the mills are from four weeks to three months behind their orders. Prophetic of a possible advance in Steel is the endeavor on the part of the largest Western producer of Iron Bars to hold to a new basis of 1.70c., Chicago, and to decline to take long time contracts even at that price. The booking of Rail business for 1906 delivery goes merrily on, 300,000 tons having been entered up the first five days after books were opened for 1906 business for one Western mill alone. Cast Iron Pipe is firm, but no contracts of size have been booked. Coke gains in

strength with the days, and the increasingly serious car shortage will have the tendency of further advancing prices unless the Milwaukee Solvay interests reconsider their decision to stay out of the Foundry trade until January. Scrap Iron and Steel are higher in tone than last week by 25c. to 50c. a ton. Wire and Nails are unchanged in price.

Pig Iron.—Large melters of Iron are taking advantage of the present lull to endeavor to negotiate favorable contracts for the first and second quarters of 1906. They are meeting with considerable success from the fact that there are Southern producers who control large tonnages who are naming \$11.75, Birmingham, basis for next year and are giving away freight differentials in the bargain. Had it not been for this influence it is entirely probable that \$12.50 would have been the fixed minimum for the first half of 1906, and that price is still insisted on by the majority of the Southern producing capacity. A Milwaukee mining machine firm is credited with having bought 2000 tons first quarter Iron at \$11.50 basis, and an Indianapolis engine builder is offered lower than \$12 for first half on 3000 tons. Local Northern Irons are unchanged at \$16 to \$16.50 basis at the furnace for No. 2 Foundry, the lower price being for such limited tonnages of spot Iron as are still available, while the higher price prevails for delayed delivery, including fourth quarter 1905 and first quarter 1906. Prices, Chicago delivery, are as follows:

Lake Superior Charcoal.....	\$16.50 to \$17.00
Northern Coke Foundry, No. 1.....	16.75 to 17.25
Northern Coke Foundry, No. 2.....	16.25 to 16.75
Northern Coke Foundry, No. 3.....	15.75 to 16.25
Northern Scotch, No. 1.....	17.25 to 17.50
Ohio Strong Softeners, No. 1.....	17.05 to 17.30
Ohio Strong Softeners, No. 2.....	16.55 to 16.80
Southern Silvery, 4 to 6 per cent. Silicon.....	16.65 to 17.65
Southern Coke, No. 1.....	15.90 to 16.15
Southern Coke, No. 2.....	15.40 to 15.65
Southern Coke, No. 3.....	14.65 to 15.15
Southern Coke, No. 4.....	14.40 to 14.90
Southern Coke, No. 1 Soft.....	15.90 to 16.15
Southern Coke, No. 2 Soft.....	15.40 to 15.65
Southern Gray Forge.....	14.15 to 14.65
Southern Mottled and White.....	13.90 to 14.40
Malleable Bessemer.....	16.50 to 16.75
Standard Bessemer.....	17.30
Jackson Co. and Ky. Silvery, 6 % Silicon.....	18.30
Jackson Co. and Ky. Silvery, 8 % Silicon.....	19.30
Jackson Co. and Ky. Silvery, 10 % Silicon.....	20.30
Alabama Basic.....	13.65

Billets.—Forging Billets are quoted regularly at from \$30 to \$32 in car lots of base sizes, with the usual extras, and as high as \$35 is paid for prompt shipment. Rolling Billets are not now a quotable commodity in this market, as no demand is in evidence.

Rails and Track Supplies.—During the first five days after the opening of its books for 1906 business the Illinois Steel Company entered over 300,000 tons of Standard Section Rails and orders are still coming in in great volume. Angle Bars have been advanced \$3 a ton. The price for 1906 is the same as it has been during the current year, \$28 a gross ton in 500-ton lots and greater, f.o.b. mill, with full freight to destination; \$30 a ton for less than 500 tons down to car lots, and \$32 a ton in less than car lots. Light Section Rails are firmer in price, the weights down to and including 12-lb. ranging from \$26 to \$29; 10-lb., \$32; 8-lb., \$35, f.o.b. mill. Angle Bars are 1.55c. to 1.65c. Spikes are stronger at 1.75c. to 1.80c. Track Bolts are quoted at 2.40c. to 2.50c., base. Square Nuts. Store prices on Track Supplies range from 15c. to 25c. per 100 lbs. above car lot mill prices.

Structural Material.—The announcement made by all the important factors that on and after September 1 Structural Steel would be quoted at 1.70c., instead of 1.60c., Pittsburgh basis, has been taken as a matter of course by the trade. This does not mean that there are not buyers of large tonnages who refuse to close at the advanced price, but prefer to wait developments before placing orders for spring shipment. Local jobbers have advanced their price to a 2.25c. minimum, instead of 2c., the official price, at which a few sections were still sold before the advance. The new official mill prices on Structural Steel for delayed delivery from mill in car lots or greater are as follows: Beams and Channels, 3 to 15 inches, inclusive, 1.86½c.; Angles, 3 to 6 inches, ¼-inch and heavier, 1.86½c.; Angles, larger than 6 inches on one or both legs, 1.96½c.; Beams, larger than 15 inches, 1.96½c.; Zees, 3 inches and over, 1.86½c.; Tees, 3 inches and over, 1.91½c., in addition to the usual extras for cutting to extra lengths, punching, coping, bending or other shop work. Store prices on Angles, Beams and Channels range from 2.25c. to 3c., according to quantity on hand in store or obtainable from mill. Premiums above even these advanced prices are obtainable for prompt shipment.

Plates.—No advance in the price of Plate Steel has yet been announced in this market, though the trade is preparing itself for a 10c. advance in sympathy with Structural Steel. Prices are unchanged, as follows: Tank quality, ¼-inch and heavier, wider than 14 and up to 100 inches wide, inclusive, car lots, Chicago, 1.76½c.; 3-16 inch, 1.86½c.; Nos. 7 and 8 gauge, 1.91½c.; No. 9, 2.01½c.; Sheared and Universal Mill Plates, Tank quality, 6¼ to 14 inches, inclusive, 10c. below these prices; Flange quality in widths up to 100 inches,

1.86½c., base, for ¼-inch and heavier, with the same advances for lighter weights; Sketch Plates, Tank quality, 1.86½c.; Flange quality, 1.96½c. Store prices on Plates are as follows: Tank Plate, ¼-inch and heavier, up to 72 inches wide, 2c. to 2.10c.; from 72 to 96 inches wide, 2.10c. to 2.20c.; 3-16 inch up to 60 inches wide, 2.10c. to 2.20c.; 72 inches wide, 2.35c. to 2.45c.; No. 8 up to 60 inches wide, 2.15c. to 2.25c.; Flange quality, 25c. extra.

Bars.—An effort is being made by the leading Iron Bar producer to secure a minimum of 1.70c. basis, Chicago, on Iron Bars. Meanwhile other large producers are satisfied with 1.65c., for the time being at least. Steel Bars are firm and mills are two to four months behind in their deliveries. We quote: Iron Bars, 1.60c. to 1.65c.; Steel Bars, 1.66½c., both half extras; Hoops, 2.10c. to 2.20c. rates, full extras; Soft Steel Angles and Shapes, 1.76½c., half extras, and Hard Steel Angles and Bars at about 10c. below the price of Soft Steel. In store prices Steel Bars and Bands are being held at a minimum of 1.85c., base, half extras; Steel Angles and Shapes, 1.95c., half extras, and Soft Steel Hoops, 2.20c., full extras, with 5c. to 10c. higher than the minimum prices named for small quantities from store.

Merchant Steel.—There is an intimation that premiums may not be impossible on some lines in which mills are the farthest behind their orders, but none has actually been demanded thus far. Current prices for delivery of straight lots not covered by contract are as follows: Smooth Finished Machinery Steel, 1.91½c.; Smooth Finished Tire, 1.86½c.; Flat Sleigh Shoe, 1.71½c.; Concave and Convex Sleigh Shoe, 1.86½c.; Cutter Shoe, 2.40c.; Toe Calk Steel, 2.21½c.; Railway Spring, 1.86½c.; Crucible Tool Steel, 6¼c. to 8c.; special grades of Tool Steel, 13c. and up; Shafting, 50 per cent. discount in car lots and 45 per cent. in less than car lots in base territory.

Merchant Pipe.—Conditions are unchanged and no relief is immediately in sight for the producers, who are forced to sell at less than cost of manufacture. Current discounts to consumers from mill on Black Steel Pipe are 77.35 to 77.85 per cent. discount on base sizes, ¾ to 6 inches, with Galvanized Steel quoted at 10 points less discount. Iron has not gone as low in proportion to Steel, however, and most producers are asking more than the 1½ points differential. Jobbers are buying Steel Pipe at 81 per cent. discount, f.o.b. Pittsburgh, and better. Chicago jobbers are charging 76 to 77 per cent. discount from store in small lots.

Boiler Tubes.—The market is strong and prices are well maintained. The following are official discounts, f.o.b. Chicago, in car lots: Steel Tubes, 62.35; Iron, 51.35; Seamless, 50.85. Store prices are nominally unchanged, as follows:

	Steel.	Iron.	Seamless.
1 to 1½ inches.....	40	35	42½
1½ to 2¼ inches.....	50	35	35
2¼ inches.....	52½	35	30
2½ to 5 inches.....	60	47½	42½
6 inches and larger.....	50	35	..

Cast Iron Pipe.—The advance named last week is being well maintained for current car lot business. No contracts of moment have been entered within a week, though current business is heavy. Prices on routine business are as follows, f.o.b. Chicago, per net ton: Water Pipe, 4-inch, \$29.50; 6, 8 and 10 inch, \$28.50; 12-inch and larger, \$27.50 per net ton, f.o.b. Chicago, with \$1 extra for Gas Pipe. Large municipal contracts are of course placed at lower basis than this. The city of Chicago last week closed an order for 2300 tons of 4-inch Pipe with the leading producer.

Coke.—Car shortage is becoming a larger and larger cloud on the horizon, and the relief that was promised from the Milwaukee by-product ovens is withdrawn for the present, that interest being obligated up to its full capacity in Foundry Coke for several months. The new by-product plant at South Chicago is hoped to be in operation before Christmas, with the output of 120 ovens or at least part of them. Prices on Connellsville Foundry Coke are firm on the basis of \$2.50, Connellsville, or \$5.15, Chicago, for Foundry Coke and \$1.90 to \$2 at the ovens, or \$4.55 to \$4.65 to users of Furnace Coke outside of blast furnaces who pay the regular \$2.65 freight rate, while blast furnaces have a rate of \$2.35.

Old Materials.—The Chicago & Northwestern road disposed of a round lot of Scrap at prices ranging slightly higher than those secured by the Burlington the week previous. There is a wide difference between dealers asking prices and prices at which local consumers will buy; and the actual tonnage moving is correspondingly small. The following quotations represent the range of prices paid by large consumers from producers and dealers in car lots and greater, f.o.b. Chicago:

Old Iron Rails.....	\$20.00 to \$20.50
Old Steel Rails, 4 feet and over.....	15.00 to 15.50
Old Steel Rails, less than 4 feet.....	14.50 to 15.00
Heavy Relaying Rails, subject to inspection.....	23.50 to 24.00
Heavy Relaying Rails, for side tracks.....	19.50 to 20.00
Old Car Wheels.....	15.50 to 16.00
Heavy Melting Steel Scrap.....	14.00 to 14.50
Frogs, Switches and Guards.....	14.00 to 14.50
Mixed Steel.....	11.50 to 12.00

The following quotations are per net ton:

Iron Fish Plates.....	\$17.50 to \$18.00
Iron Car Axles.....	22.50 to 23.00
Steel Car Axles.....	17.50 to 18.00
No. 1 Railroad Wrought.....	16.00 to 16.50
No. 2 Railroad Wrought.....	15.00 to 15.50
Locomotive Tires, smooth.....	14.15 to 14.00
Railway Springs.....	13.50 to 14.00
Shafting.....	16.00 to 16.50
No. 1 Dealers' Forge.....	12.00 to 12.50
Wrought Pipes and Flues.....	11.75 to 12.25
No. 1 Cut Busheling.....	11.75 to 12.25
Iron Axle Turnings.....	11.00 to 11.25
Soft Steel Axle Turnings.....	10.75 to 11.25
Machine Shop Turnings.....	10.75 to 11.00
Cast Borings.....	9.00 to 9.25
Mixed Borings, &c.....	9.00 to 9.25
No. 1 Mill.....	9.25 to 9.50
Country Sheet.....	8.25 to 8.50
No. 1 Boilers, cut to Sheets and Rings.....	10.75 to 11.25
No. 1 Cast Scrap.....	13.50 to 14.00
Stove Plate and Light Cast Scrap.....	11.75 to 12.00
Railroad Malleable.....	14.00 to 14.50
Agricultural Malleable.....	13.00 to 13.25

Metals.—Pig Tin is weaker in tone and $\frac{1}{2}$ c. lower in price. We quote Casting Copper in car lots $16\frac{3}{4}$ c. to $16\frac{1}{2}$ c.; Lake, $16\frac{1}{2}$ c. to 17 c., less than car lots $\frac{1}{2}$ c. to $\frac{3}{4}$ c. higher; Pig Tin, car lots, $34\frac{1}{2}$ c. to 35 c.; smaller lots, $35\frac{1}{2}$ c. to 36 c. Spelter is held at 6c. for car lots and $6\frac{1}{4}$ c. to $6\frac{3}{4}$ c. for small lots. Lead is 4.90c. for 50-ton lots, 4.95c. for car lots and $5\frac{1}{4}$ c. to $5\frac{1}{2}$ c. for small lots. Sheet Zinc is $\$7.50$ list, f.o.b. Lassel, in car lots of 600-lb. casks. On Old Metals we quote: Copper Wire, $14\frac{1}{4}$ c.; Heavy Copper, $13\frac{1}{2}$ c.; Copper Bottoms, 13c.; Copper Clips, $13\frac{1}{2}$ c.; Red Brass, $13\frac{1}{4}$ c.; Red Brass Borings, $10\frac{3}{4}$ c.; Yellow Brass, Heavy, $9\frac{1}{4}$ c.; Yellow Brass Borings, 8c.; Light Brass, $7\frac{1}{4}$ c.; Lead Pipe, $4\frac{1}{4}$ c.; Tea Lead, 4c.; Zinc, $4\frac{1}{4}$ c.; Pewter, No. 1, 21c.; Block Tin Pipe, 29c.

Cincinnati.

FIFTH AND MAIN STS., Sept. 6, 1905.—(By Telegraph.)

Pig Iron.—The actual business transacted in this territory during the past week shows no material gain over the week preceding. Prices for both Northern and Southern Irons are holding firm and are practically unchanged from last report. There is apparently quite a strong undertone manifested, and a very good feeling prevails throughout the trade. The foundry trade taken as a whole is reported as more active, most of the foundries having covered for immediate needs some weeks since. Reports from adjacent territory show an increased demand for both Basic and Malleable grades, principally from the West, however. Gray Forge and the lower grades are said to be almost a drug on the market, and Southern furnaces are reported as very anxious to dispose of considerable tonnage they have on hand. High grades of Soft Iron from the South are not so plentiful, and the situation is quite satisfactory. The demand for Northern Iron seems to be improved and the market in this respect looks better. The action of the United States Steel Corporation in contracting for a portion of the Iron desired, with a fair prospect of another purchase later, has not been without its effect on the market in general, as a heavy tonnage will no doubt be diverted to the manufacture of Bessemer that otherwise would have gone into the Foundry grades. The feeling generally appears to be that so far as prices are concerned they are well established and bid fair to remain so for some time to come. Sales reported during the week are as follows: Five hundred tons of Southern No. 2 for Louisville delivery, 500 tons each of Northern and Southern to a concern in Indianapolis, 1000 tons No. 2 Soft to a northern Ohio concern, 600 tons to a central Ohio stove works and about 1500 tons to a Michigan plant, delivery to cover the first six months of next year. We note but two inquiries of any tonnage, one being for 2000 tons from a central Ohio manufacturer and one for 3200 tons of Southern Iron covering the last quarter's delivery from Michigan. Freight rates from Hanging Rock, \$1.15, and from Birmingham, \$2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1.....	\$14.75 to \$15.25
Southern Coke, No. 2.....	14.25 to 14.75
Southern Coke, No. 3.....	13.75 to 14.25
Southern Coke, No. 4.....	13.25 to 13.75
Southern Coke, No. 1 Soft.....	14.75 to 15.25
Southern Coke, No. 2 Soft.....	14.25 to 14.75
Southern Coke, Gray Forge.....	13.00 to 13.50
Southern Coke, Mottled.....	12.75 to 13.25
Ohio Silvery, No. 1.....	18.15 to 18.40
Lake Superior Coke, No. 1.....	15.65 to 15.90
Lake Superior Coke, No. 2.....	15.15 to 15.40
Lake Superior Coke, No. 3.....	14.65 to 14.90

Car Wheel and Malleable Irons.

Standard Southern Car Wheel.....	\$17.75 to \$18.25
Lake Superior Car Wheel and Malleable.....	17.75 to 18.00

Coke.—The market is strong and shows continued improvement. Apparently there is not much new business moving, but prices have advanced a shade. We quote, f.o.b. ovens, as follows: Connellsville Foundry, \$2.50 to \$2.75; Furnace, \$2 to \$2.25; Virginia Foundry, \$2.40 to \$2.50; Furnace, \$2.25.

Finished Iron and Steel.—The situation is unchanged and a heavy tonnage is being booked. Conditions are ex-

pected to show very little change along this line, the mills having all that they can handle. We quote, f.o.b. Cincinnati, as follows: Iron Bars, in carload lots, 1.65c., with half extras; the same in smaller lots, 1.90c., with full extras; Steel Bars, in carload lots, 1.63c., with half extras; the same in small lots, 1.85c., with full extras; Base Angles, 1.73c., in carload lots; Beams and Channels, in carload lots, 1.73c.; Plates, $\frac{1}{4}$ -inch and heavier, 1.73c., in carload lots; in smaller lots, 1.90c.; Sheets, 16-gauge, in carload lots, 2.15c.; in smaller lots, 2.70c.; 14-gauge, in carload lots, 2.05c.; in smaller lots, 2.60c.; Steel Tire, $\frac{3}{4}$ x 3-16 and heavier, 1.83c., in carload lots.

Old Material.—Trade is more active than it has been for some weeks and considerable tonnage has been sold. Dealers anticipate more activity during the present month than since early spring. Prices are about the same so far as we can learn, although we are inclined to believe they have strengthened somewhat. We quote dealers' prices, f.o.b. Cincinnati, as follows: No. 1 Railroad Wrought Scrap, \$14 to \$15 per net ton; No. 1 Cast Scrap, \$12 to \$12.50 per net ton; Iron Rails, \$18 to \$19 per gross ton; Steel Rails, rolling mill lengths, \$13 to \$14 per gross ton; Relaying Rails, 56-lb. and upward, \$22 to \$23 per gross ton; Iron Axles, \$19 to \$20 per net ton; Car Wheels, \$14 to \$15 per gross ton; Heavy Melting Scrap, \$12 to \$12.50 per gross ton; Low Phosphorus Scrap, \$14 to \$14.50 per gross ton.

Cleveland.

CLEVELAND, OHIO, September 5, 1905.

Iron Ore.—Delays have been the lot of the lake fleet in the past week. Boats were badly bunched at the head of the lakes; a storm in the upper lake region delayed loading as well as the movement of vessels and a double holiday on the docks caused further delay. Vessel tonnage is being diverted to the Coal trade constantly, thus cutting down the available supply for moving Ore. In addition docks are crowded with Ore and all movement must be direct to furnaces. Furnace stock room is limited and the car supply is growing shorter, so that a lighter Ore movement for the remainder of the season is indicated. Shippers say they could well afford to slacken the pace for the remainder of the year in view of what has been done up to September 1. Rates remain at 75c. from Duluth to Ohio ports, 70c. from Marquette and 60c. from Escanaba.

Pig Iron.—Some buying of Foundry Iron has been reported at \$14.25 in the Valleys, but it is beginning to be apparent that the furnaces which have so little business that they will take this price are few. This strengthens the position of those who have been holding for \$14.50. The purchase by the Steel Corporation of its September needs in Bessemer Iron has helped that market. Producers find that their market is growing in circles not connected with the United States Steel Corporation and that they are less dependent on the buying of that organization. The general buying therefore seems to have a greater influence on the market than the action of the corporation. The statement is made that most of the low priced Iron is out of the market and sales are made at \$14.50 in the Valleys. The demand for Basic has been strong, with one or two contracts closed aggregating close to 10,000 tons. The Malleable trade is in the same condition, the price holding at \$14.50 in the Valleys. The Coke market is stronger, with the buying of such a nature that higher prices are anticipated. The market is \$2.35 to \$2.50 for the best grades of 72-hour Coke, while Furnace Coke sells at \$2 at the oven.

Finished Iron and Steel.—Announcement was made in the past week that the American Shipbuilding Company has closed contracts for two new boats to be delivered by the opening of navigation in 1906. This is part of the orders for seven vessels reported in this column as pending. It is expected that the other five will be placed shortly. Advices come from various points on the lake that other boats are wanted and deliveries will decide whether the orders will or will not be placed. Provision had been made that specifications for Steel for the seven boats will apply on old contracts. Regardless of the strike tying up building work the Structural situation is strong, most of the mills being in a position where further orders cannot be taken for this year's delivery. The practice is continued of taking orders and specifications together, the mills being at liberty to ship the Steel when they can conveniently do so. Jobbers are shipping out material almost as fast as received and business at a premium of from \$5 to \$7 a ton is still going to the smaller mills. The demand for Plates is increasing and the mills are reporting a shortage. New business and specifications against old contracts are coming in steadily, giving a healthy tone to trading. The price has remained firm at 1.60c., Pittsburgh. Bar buying has reached a boom stage. The demand for Bar Iron is stronger than at any time this year and the big orders placed during the past six weeks have filled up the mills to such a point that higher prices are asked. The rise is partly due, however, to the action of the Scrap dealers in putting up prices. The recent advance

in Bar Iron to 1.70c. at the mill did not seem to check the activity. In addition there is a much stronger buying movement among the consumers of Steel Bars, specifications being heavy and new orders coming in steadily, all indicating an increased consumption. The price holds at 1.50c., Pittsburgh, for both Bessemer and Open Hearth. There is something approaching a serious shortage of Billets in this territory. Some of the larger consumers have had inquiries in the market for the past three weeks and it is a question where the Steel is to come from. Prices have held at the top, with a further tendency upward. Buying has been free at \$26 to \$27, Pittsburgh, for Bessemer 4 x 4 inch Billets, and higher for Forging Billets. Some good inquiries are up for Rails, but no orders have been placed. The Sheet market is a little stronger, the larger mills which were cutting prices to get business seeming to be better satisfied. Prices out of stock remain unchanged at 2.15c. for No. 10 Blue Annealed, 2.65c. for No. 28 One Pass Cold Rolled and 3.65c. for No. 28 Galvanized.

Old Material.—With the increased activity among the rolling mills the market has been strengthened for Scrap, and there is a better buying movement. Prices are stronger but have not changed much. The following represent dealers' quotations to the consumer, gross tons: Old Steel Rails, \$15; Old Iron Rails, \$20 to \$21; Old Car Wheels, \$15 to \$15.50; Heavy Melting Steel, \$15 to \$15.50. Net tons: Cast Borings, \$7.50 to \$8.50; No. 1 Busheling, \$13.50 to \$14; No. 1 Railroad Wrought, \$15.50 to \$16; Iron Car Axles (nominal), \$21 to \$22; No. 1 Cast, \$13.50 to \$14; Stove Plate, \$10 to \$10.50; Iron and Steel Turnings and Drillings, \$10 to \$10.50.

Philadelphia.

REAL ESTATE TRUST CO. BUILDING, September 5, 1905.

The indifference which has characterized buyers during the past three or four months has been pretty well dissipated and they are now showing some eagerness to place orders. This is more apparent in some lines than in others, although there is a better tone throughout the entire market, and the movement will no doubt become more general as the month advances. Consumption, which has been heavy during the entire year, is sure to show a considerable increase from this time forward and everything that can be turned out will no doubt be promptly taken. Prices will naturally be better, but no such advance is expected as in former boom periods. There are several reasons for this, one being that the productive capacity is so great that there need be no absolute scarcity, and neither need there be any great advance in prices to stimulate the output. These much to be desired conditions have been evolved from experiences during the past five or six years and are in no small degree due to the increased conservatism of buyers. Twice if not three times during the period named they have found that in trying to protect themselves by contracts extending over six months to a year they made serious mistakes. This year, for instance, they ran prices up to figures at least \$1 to \$1.50 more than they need to have paid; and in 1903 they did still worse, having forced an advance of \$5 to \$6 per ton, followed by a still heavier decline in 1904. Exception may be taken to the statement that buyers forced the advance, but sellers could not do it without buyers helping them to do it. If a buyer comes in on a strong market and asks for a price for deliveries covering six months and takes the Iron he stiffens the market, and if a half dozen other large buyers do the same thing prices are advanced until all along the line everybody wants Pig Iron. Then the first buyer thinks he would like to cover another quarter and gets quotations at higher prices than he expected to pay, but everything looks strong and he again takes the Iron. The seller, as a matter of self protection, again advances his prices, and so it goes until every buyer, big and little, has all the Iron he wants. Then when there are no more buyers left the market gets dull and prices are less firm. If consumption is maintained deliveries are taken without much trouble and prices are held fairly steady, even if there is little or no demand; but in nine cases out of ten buyers have engaged more Iron than they expected they would need and it is this that eventually starts the market on the down grade, and the higher the price the more rapid the decline. The present attitude of buyers is more conservative. If prices are going higher they are ready to pay whatever rates the conditions seem to warrant. They may perhaps have to pay more money for a while; but on the other hand they are all to the good if there is a decline. The impression among buyers is that they will have to pay an advance, possibly 50c. or it may be \$1 more, but they are not inclined to force it by making purchases for extended deliveries. There is a reasonably good prospect that 8,000,000 tons of Pig Iron will be consumed during the remainder of 1905. If a tonnage in proportion to that is bought within 30 days prices, of course, would go clean out of sight; but the same tonnage divided into weekly or monthly purchases would amount to precisely the same thing as regards buyers and sellers, and it would certainly prevent either a boom in prices or a reaction to lower prices. Buyers are getting

educated to new methods and sellers are equally desirous to eliminate the speculative element as far as it is possible to do so. The outlook, therefore, indicates a steady, active market during the remainder of the year, and possibly at a somewhat higher range of prices.

Pig Iron.—The market has shown considerable activity during the past few days, with prospects that it will be still more active as the season advances. Consumers are evidently beginning to give serious consideration to their probable requirements during the remainder of the year, and if it were not for the certainty of a large supply prices would begin to jump. The capacity for production, however, is believed to be entirely adequate, so that the movement in prices will be on conservative lines and no great anxiety is felt in regard to a runaway market; but a very active demand during the next few weeks seems to be assured. Contracts are rapidly approaching completion and renewals must be made on best terms that can be arranged. Makers of Pig Iron are disposed to meet buyers at satisfactory figures, but the course of prices will depend in no small degree upon the action of buyers. This feature has been considered in the preliminary remarks, so that it need only be said that the market will be very largely in their hands during the next few weeks. Sellers will not refuse a reasonable amount of business at about to-day's prices, but if it is thrust on them as it was several months ago it will be difficult to avoid similar results—viz., large sales at advancing prices—followed by a period of stagnation at declining prices, both of which could have been avoided by shorter contracts. The next few weeks will tell the story, however, and in the meanwhile negotiations are in progress for considerable tonnages on the basis of about \$16.25 to \$16.50 for No. 2 X Foundry, \$15.50 to \$15.75 for Basic and \$20.75 to \$21 for Low Phosphorus. Sales of the first named have been in fairly large sized lots, but nothing of importance has been done in Basic, which is strongly held at \$15.50 as a minimum figure. Low Phosphorus shows more activity than it has for months past. Lots of from 500 to 5000 tons each have been closed with a number of smaller lots still under negotiation. The range of prices for Philadelphia and nearby deliveries at this writing would be about as follows:

No. 1 X Foundry.....	\$17.25 to \$17.50
No. 2 X Foundry.....	16.25 to 16.50
No. 2 Plain.....	15.75 to 16.00
Standard Gray Forge.....	14.75 to 15.00
Basic.....	15.50 to 15.75
Low Phosphorus.....	20.50 to 21.00
Southern No. 2 X, rail.....	15.75 to 16.00
Southern No. 2 X, on dock.....	15.00 to 15.25
Southern Gray Forge.....	14.50 to 14.75

Ferromanganese.—There is not much doing, but the offerings are light, and about \$48, c.i.f., would have to be paid for prompt shipments.

Ferrosilicon.—Not much demand, but \$93 to \$95 would have to be paid for 80 per cent. Silicon.

Steel.—The market is very active and prices are decidedly strong. Large lots of Open Hearth Steel can be had for about \$27, delivered, but \$27.50 is quoted on small lots. Mills very full of work and somewhat pushed for prompt shipments.

Muck Bars.—The market is again in a very dead condition and prices are hard to quote. Something might perhaps be done at \$26.50, sellers' mill, but they ask \$27 and upward. A sale of 1000 tons, special quality, was made last week at \$28, delivered.

Plates.—There is a better demand and the dullness experienced during the past few weeks is gradually passing away. Some of the demand is from the West, from which it is assumed that the mills in that district have all the business they can handle. Locally consumers are very busy, but there is no difficulty in getting fairly prompt deliveries of all the material they want.

	Carload. Cents.	Part carload. Cents.
Tank, Bridge and Boat Steel, over 14 inches wide.....	1.73½	1.78½
Tank, Bridge and Boat Steel, rectangular Plates, 14 inches wide and under.....	1.63½	1.68½
Flange or Boiler Steel.....	1.83½	1.88½
Marine, A. B. M. A. and Commercial Fire Box Steel.....	1.93½	1.98½
Still Bottom Steel.....	2.03½	2.08½
Locomotive Fire Box Steel.....	2.23½	2.28½
The above are base prices for ¼-inch and heavier. The following extras apply: Per 100 pounds extra.		
3-16-inch thick.....	\$0.10	
Nos. 7 and 8, B. W. G.....	.15	
No. 9, B. W. G.....	.25	
Plates over 100 to 110 inches.....	.05	
Plates over 110 to 115 inches.....	.10	
Plates over 115 to 120 inches.....	.15	
Plates over 120 to 125 inches.....	.25	
Plates over 125 to 130 inches.....	.50	
Plates over 130 inches.....	1.00	

Structural Material.—There is little to be said in regard to this interest, except that there is no abatement in the demand, with very little chance of any easing up for a long time to come. Prices have been advanced somewhat and are now quoted at 1.88½c. to 2c., delivered, for Beams and Channels up to 15 inches and a tenth more for large sizes. Small Angles 1.88½c. to 2.10c.

Bars.—There is a good demand and full prices have to be paid for Best Refined Iron. The mills are not pressed with orders, but they have enough to keep them comfortably employed, and manufacturers are sanguine that they will see both a better demand and better prices in the near future. Steel Bars are firm, but as a rule orders can be placed at 1.63½c. for either Refined Iron or Soft Steel Bars.

Sheets.—Business does not come out as freely as expected and manufacturers are disappointed at the indifference which buyers manifest. Small lots are in pretty good demand, but at best it is merely a hand-to-mouth business at about the following prices, viz.: 18 to 20 gauge, 2.30c.; 22 to 24 gauge, 2.40c.; 25 and 26 gauge, 2.50c.; 27 gauge, 2.60c., and 28 gauge, 2.70c.

Old Material.—There is very little change in the Scrap trade, prices being about the same as last week. Holders are firm, but consumers manage to pick up odd lots at inside figures and so far have been able to supply their most pressing requirements, but the final outcome is still somewhat doubtful. Low Phosphorus Scrap sold at \$20.50 for 0.35 per cent., but a dollar more would have to be paid for strictly 0.03 per cent. Bids and offers are as follows for deliveries in buyers' yards:

Scrap Steel Rails.....	\$16.00 to \$16.25
No. 1 Steel Scrap.....	15.50 to 16.00
Old Steel Axles.....	21.00 to 21.50
Old Iron Axles.....	25.00 to 25.50
Old Iron Rails.....	22.00 to 23.00
Old Car Wheels.....	15.50 to 16.00
Choice Scrap, R. R. No. 1 Wrought.....	20.50 to 21.00
No. 1 Yard Scrap.....	18.00 to 18.50
Long and Short.....	17.00 to 17.50
Machinery Scrap.....	15.00 to 15.50
Wrought Iron Pipe.....	15.50 to 16.00
No. 1 Forge Fire Scrap.....	15.00 to 15.50
No. 2 Light Ordinary.....	12.00 to 12.50
Wrought Turnings.....	13.50 to 14.00
Axle Turnings, Choice Heavy.....	14.00 to 14.50
Cast Borings.....	9.75 to 10.00
Stove Plates.....	13.50 to 14.00

Pittsburgh.

PARK BUILDING, September 6, 1905.—(By Telegraph.)

Pig Iron.—The purchase of 25,000 tons of Bessemer by the United States Steel Corporation has firmed up the market a good deal and the two leading sellers, the Bessemer Pig Iron Association and W. P. Snyder & Co., are holding Bessemer Iron at \$15, Valley furnace, and refuse to sell at less than this price. It is possible, however, that some small lots of Bessemer in the hands of dealers and piled up at furnaces outside the association could be bought at \$14.75, at furnace. A leading consumer has bought upward of 10,000 tons of standard Bessemer for balance of year delivery at prices ranging from \$14.35 up to \$14.75, Valley furnace. The low price of \$14.35 on part of this Iron is explained by the fact that the consumer got an option on it several weeks before prices advanced and exercised it. We note other sales of upward of 10,000 tons of standard Bessemer for balance of the year delivery at \$14.45 to \$14.75, Valley furnace, one sale of 5000 tons having been made at \$14.75, deliveries 1000 tons a month, September to January. We quote Bessemer and Basic Iron at \$14.75 to \$15, Valley furnace, equal to \$15.60 to \$15.85, Pittsburgh. There is more inquiry for Foundry Iron than for some time, Northern brands of No. 2 being very firm at \$14.25 to \$14.50, Valley furnace. We note sales of 2500 tons at the lower price, which is equal to \$15.10, Pittsburgh. Forge Iron, which has been very dull for some time, is showing betterment, two local consumers being in the market for 1500 tons each. Northern brands of Forge are held at about \$13.75, Valley, or \$14.60, Pittsburgh, but on a firm offer this might be shaded 10c. to 15c. a ton.

Steel.—We note a continued scarcity in Bessemer and Open Hearth Steel, and it is doubtful if Bessemer Billets could be bought to-day at less than \$25, maker's mill, while Open Hearth Billets, ordinary Carbons, are held at \$26 to \$27, maker's mill. Forging Billets are scarce and higher in price and are held at \$29 to \$31, depending on specifications. The Sharon Steel Hoop Company, Sharon, Pa., has started up its 23-inch blooming mill and 12-inch finishing train, which have been idle some time undergoing repairs. Its Open Hearth Steel plant, comprising four 25-ton Basic and one 35-ton acid furnaces, is running full, making about 400 tons a day of Billets and Sheet Bars, all of which is used by the company in the manufacture of Hoops, Bands and Cotton Ties. It has not been a seller of Steel in the open market for some time.

(By Mail.)

The event of the week was the placing of contracts by the Pennsylvania Railroad Company for 12,000 or more Steel cars, of which the Pressed Steel Car Company got about 8500, the balance going to the Standard Steel Car Company and American Car & Foundry Company. The Cambria Steel Company did not get any of these Steel cars to build, as it is not in position to make deliveries wanted.

These contracts for Steel cars mean a consumption of 125,000 tons or more of Steel Plates and Small Shapes, which insures steady work to the larger Plate mills through the winter months. The same railroad company is expected to place orders for more cars in the near future. The Midvale Steel Company, Philadelphia, which was in the market recently for 5000 to 10,000 tons of Standard Bessemer Iron for balance of the year delivery, has not placed contracts with any of the furnaces in this district for this Iron, but has bought upward of 7000 tons of Low Phosphorus Iron at about \$20.75, delivered at its works, the business going to Eastern makers. The Pig Iron market has been rather quiet since the purchase of the United States Steel Corporation, but prices are very strong, some of the larger sellers asking \$15 at Valley furnace for Bessemer and Basic Iron for balance of the year delivery. Some of the smaller dealers and furnaces outside of the Bessemer Pig Iron Association are quoting \$14.50 to \$14.75 at furnace for prompt Iron, but \$14.50 is absolute minimum of the market and very little Iron could be had at this price. Stocks held by Valley furnaces are pretty well worked off and the Bessemer Iron market is very strong. There is only a fair inquiry for Foundry Iron, sellers quoting \$14.25 to \$14.50 at Valley furnace, with the probability that \$14 at furnace could be done on very desirable tonnage. Forge Iron is not so dull and is nominally \$13.75, Valley, or \$14.60, Pittsburgh. Steel continues scarce, Bessemer and Open Hearth Billets for prompt delivery bringing \$25 and upward. General conditions in Finished Iron and Steel are very good, and in Plates, Steel Bars and Structural Steel the mills are gorged with tonnage, leading concerns being out of the market as sellers of these products for balance of the year delivery. The Scrap and Coke trades are more active and prices are firmer. Sheets and Tin Plate have improved perceptibly in demand.

Ferromanganese.—A leading local interest has been a heavy buyer of foreign Ferro, taking 5000 to 10,000 tons at \$49.50, delivered, Pittsburgh. The general demand is quite active and we quote foreign 80 per cent. Ferro at \$49.50 to \$50, Pittsburgh.

Rods.—There is only a fair inquiry for Rods. We quote Bessemer and Open Hearth at \$31 to \$31.50, and Chain Rods \$32.50 to \$33, maker's mill.

Steel Rails.—Western railroads have placed additional heavy tonnages for 1906 delivery. The Rail mills have booked practically all the tonnage they can turn out this year and inquiries for next year are active. Light Rails are in fairly active demand and we quote 30-lb. to 45-lb. Sections at \$25; 25-lb., \$26; 20-lb., \$28, and 16-lb., \$29, maker's mill. Some of the smaller mills that roll Light Rails might shade these prices about \$1 a ton.

Skelp.—A good deal of tonnage in Skelp has recently been placed and the mills are pretty well filled for the next several months. The market is quite firm and we quote: Bessemer Grooved Skelp, 1.50c. to 1.55c.; Open Hearth, 1.55c. to 1.60c.; Sheared, \$1 advance; Grooved Iron Skelp, 1.60c.; Sheared, 1.67½c. to 1.70c., maker's mill. For very desirable sizes some mills might slightly shade these prices.

Plates.—The order for 12,000 or more Steel Cars placed by the Pennsylvania Railroad Company means a consumption of upward of 125,000 tons of Plates and Small Shapes, and the leading Plate mills that will share in this tonnage are assured of full work for the next four or five months. The general demand for Plates from Boiler shops and other consumers is very active, and there probably never was a time when the Plate mills had as much work ahead of them as they have at present. As yet there are no indications of an advance in prices, but it would seem the time is near when premiums will have to be paid for prompt shipment. We quote Tank Plates, ¼ inch thick, 6¼ to 14 inches wide, 1.50c., base; over 14 inches wide and up to 100 inches in width, 1.60c., base, at mill, Pittsburgh. Extras over the above prices are as follows:

	Extra per 100 pounds.
Gauges lighter than ¼-inch to and including 3-16-inch Plates on thin edges.....	\$0.10
Gauges No. 7 and No. 8.....	.15
Gauge No. 9.....	.25
Plates over 100 to 110 inches.....	.05
Plates over 110 to 115 inches.....	.10
Plates over 115 to 120 inches.....	.15
Plates over 120 to 125 inches.....	.25
Plates over 125 to 130 inches.....	.50
Plates over 130 inches.....	1.00
All sketches (excepting straight taper Plates varying not more than 4 inches in width at ends, narrowest end being not less than 30 inches)...	.10
Complete Circles.....	.20
Boiler and Flange Steel Plates.....	.10
Marine, "A. B. M. A." and ordinary Fire Box Steel Plates.....	.20
Still Bottom Steel.....	.30
Locomotive Fire Box Steel.....	.50
Shell Grade of Steel is abandoned.	

TERMS.—Net cash 30 days. For anticipated payments a maximum discount may be allowed at the rate of 6 per cent. per annum and for a longer time than 30 days interest shall be charged at the same rate per annum. Invoices paid within ten days from date thereof, discount of ¼ of 1 per cent. is allowable. Pacific Coast base, 1.40c., f.o.b. Pittsburgh, with all rail tariff rate of freight to destination added, no reduction for rectangular shapes 14 inches wide down to 6 inches of Tank, Ship or Bridge quality.

Structural Material.—Effective September 1, prices on Structural Steel were advanced \$2 a ton, this action being generally anticipated by the trade on account of the enormous demand and the fact that the mills are filled up for months and are very much behind in deliveries. A good deal of work has been placed and much more is in sight. Much work is yet to come in which was not covered before the advance was made. A large job that is in the market is a Steel bridge to be built across the river at Ironton, Ohio, by the Cincinnati, Hamilton & Dayton Railroad and which will require 11,000 to 12,000 tons. The Vilsack Building, on Second avenue, this city, is in the market, and the material for the Phipps office building, on Penn avenue, has been placed with a local mill. Structural fitting shops complain very much of tardy deliveries by the mills, particularly in Open Hearth Material, and a good deal of work is being held up. We revise prices and now quote: Beams and Channels, up to 15-inch, 1.70c.; over 15-inch, 1.80c.; Angles, 3 x 2 x 1/4 inch thick up to 6 x 6 inches, 1.70c.; Angles, 8 x 8 and 7 x 3 1/2 inches, 1.80c.; Zees, 3-inch and larger, 1.70c.; Tees, 3-inch and larger, 1.75c. Under the Steel Bar card Angles, Channels and Tees under 3-inch are 1.60c., base, for Bessemer and Open Hearth, subject to half extras on the Standard Steel Bar card.

Sheets.—A moderate amount of new tonnage is being placed and the mills as a rule have more orders on their books than for some time. There is a good deal of complaint by the mills over the low prices ruling for Sheets in comparison with the high prices being charged for Sheet Bars, and it is explained there is very little money at present prices for the mills that buy their Sheet Bars in the open market. Prices are firm and we quote: Black Sheets, box annealed, one pass through cold rolls, No. 24 gauge, 2.05c. to 2.10c.; No. 26, 2.15c. to 2.20c.; No. 27, 2.20c. to 2.25c.; No. 28, 2.25c. to 2.30c. The lower prices quoted on Black Sheets represent minimum of the market and are obtainable only on large tonnage. Galvanized Sheets are quite firm and we quote: Nos. 22 and 24, 2.75c. to 2.80c.; Nos. 25 and 26, 2.95c. to 3c.; No. 27, 3.10c. to 3.15c.; No. 28, 3.30c. to 3.35c. We quote No. 28 Gauge Painted Roofing Sheets at \$1.65 to \$1.75 per square, and Galvanized Roofing Sheets, No. 28 gauge, at \$2.85 to \$2.95 for 2 1/2-inch corrugation. Jobbers charge the usual advances over above prices for small lots from store.

Iron and Steel Bars.—A heavy tonnage is being placed in both Iron and Steel Bars, and the leading mills have all the tonnage on their books in Steel Bars that they can turn out in the next three or four months. Tonnage in Iron Bars is also heavy, and the recent advance of \$2 a ton in prices of Iron Bars made by the Republic Iron & Steel Company is being firmly held. We quote Iron Bars at 1.60c., Youngstown, equal to 1.65c., Pittsburgh, while Steel Bars are 1.50c., base, half extras, f.o.b. Pittsburgh, for carloads and larger lots.

Hoops and Bands.—A very heavy tonnage is being placed in Hoops and at the full price of 1.65c., at mill. Bands are also quite active in demand, while specifications on old contracts are coming in very freely. We quote Hoops at 1.65c., at mill, and Bands at 1.50c., extras as per Steel card.

Tin Plate.—While the demand is not as heavy as the mills would like to have it, yet it is improving to some extent, and several plants that have been idle since July 1 for inventory and repairs and also for lack of orders have booked sufficient orders to warrant starting up and will do so in a short time. We continue to quote at \$3.50 to \$3.55, base, terms 30 days, less 2 per cent. off for cash in 10 days. These prices, however, are shaded by jobbers and some of the mills to the extent of 15c. a box or more.

Merchant Steel.—The mills report a heavy volume of business, while specifications on large contracts made some time ago are coming in very freely. Prices on current orders not covered by contracts are as follows: Flat Sleigh Shoe, 1.50c. to 1.55c.; Toe Calk Steel, 2c. to 2.05c.; Smooth Finished Tire, 1.65c. to 1.70c.; Cutter Shoes, 2.15c. to 2.20c.; Railway Spring Steel, 1.65c. to 1.70c.; Crucible Tool Steel, 5 1/2c. to 8c. for ordinary grades; special grades, 12c. and upward. Shafting is in fair demand, discounts being 50 per cent. off in carloads and 45 per cent. in less than carloads.

Railroad Spikes.—The demand continues active and prices are firm on the basis of \$1.65 to \$1.70 per 100 lbs., maker's mill.

Spelter.—While the demand is dull, prices are firm and higher and we quote prime grades of Western at 5.60c., St. Louis, equal to 5.72 1/2c., Pittsburgh.

Merchant Pipe.—The Ohio Fuel Supply Company has placed a contract with the National Tube Company for about 60 miles of 18-inch Line Pipe, to take natural gas from Xenia to Cincinnati, Ohio. The balance of the line from Columbus to Xenia will likely be laid next spring, when 50 miles or more of 18-inch Pipe will be needed. A local mill has also taken a contract for 15 miles of 10-inch Line Pipe. Tonnage in Merchant sizes is fairly large, but prices are low. In oil country goods demand is absolutely

flat and has been all this year. Merchant sizes of Pipe are being sold at 79 to 80 per cent. off, the lower price being made to the large trade only. Official discounts, which are shaded 4 to 5 points, are as follows:

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
	Per cent.	Per cent.	Per cent.	Per cent.
1/4 and 1/2 inch.....	67	51	65	49
3/4 and 1 inch.....	71	59	69	57
1 1/4 to 6 inches.....	75	65	73 1/2	63 1/2
7 to 12 inches.....	70	55	68 1/2	53
Extra strong, plain ends, 1/4 to 1/2 inch.....	60	48	58	46
1/4 to 1 inch.....	67	55	65	53
1 1/4 to 8 inches.....	63	51	61	49
Double extra strong, plain ends, 1/4 to 8 in.....	56	45	54	43

Boiler Tubes.—The demand continues very active, prices being firm and the mills from three to four weeks behind in deliveries. Discounts to consumers are as follows:

	Iron.	Steel.
1 to 1 1/2 inches.....	41	44
1 1/2 to 2 1/2 inches.....	41	56
2 1/2 inches.....	46	58
2 1/2 to 5 inches.....	53	64
6 to 13 inches.....	41	56

Coke.—The demand for both Furnace and Foundry Coke is much better than for some time and several inquiries are in the market for Furnace Coke for shipment through first half of next year. Firm offers of \$2 a ton for Connellsville Furnace Coke have been made by furnaces for delivery through first half of 1906 and have been declined. Prices of Coke are better and strictly Connellsville Furnace Coke for prompt shipment is held at \$1.90 to \$2, at oven, while for balance of this year \$2 a ton and higher is quoted. Some makers have their Foundry Coke product so well sold up that they have advanced prices to \$2.50 a ton at oven. We quote strictly Connellsville Furnace Coke at \$1.90 to \$2 and 72-hour Foundry at \$2.40 to \$2.50, at oven; Main Line Furnace Coke, made outside the Connellsville region, is held at \$1.65 to \$1.75 for prompt delivery, and Foundry from \$2 to \$2.25, at oven. The output of Coke is increasing, the Upper Connellsville region having gained 8000 tons and the Lower Connellsville region 2000 tons in output last week over the previous week, the total output of last week having been about 350,000 tons, the largest in any one week for some months.

Iron and Steel Scrap.—While the actual tonnage of Scrap being sold is relatively small there is a good deal of inquiry and it is probable that buying will be much heavier in the near future. Prices of Heavy Melting Scrap have advanced and it is now held at \$15.50 to \$16 a ton, some sellers refusing absolutely to sell at less than \$16. Other grades of Scrap are very firm in price, and we quote: No. 1 Wrought Scrap, \$15.50 to \$16; Cast Iron Borings, \$8.25 to \$8.50; Bundled Sheet Scrap, \$13 to \$13.25; Cast Steel Scrap, \$14.50; Machinery Cast Scrap, \$14.50; Old Steel Rails, short pieces, \$15 to \$15.50; long pieces, \$15.50 to \$16, all in gross tons, f.o.b. Pittsburgh.

New York Pig Iron Warrant Market.

The total sales of pig iron warrant certificates on the New York Produce Exchange for the past week aggregated 1300 tons, of which were 100 tons foundry, August delivery, at \$15.50. The other transactions were: 500 tons cash, \$15, and 300 tons cash, \$15.25; 100 tons November, \$15.55, and 300 tons November, \$15.60. The following quotations were established on call Wednesday noon:

	Regular.		Foundry.	
	Bid.	Asked.	Bid.	Asked.
Cash				
September	\$14.90	\$15.50	\$15.00	\$15.75
October	15.20	15.45	15.00	15.75
November	15.30	15.50	15.30	15.75
December	15.20	15.60	15.35	15.75
January	15.25	16.00	15.35	16.00
February	15.25	16.00	15.40	16.00
March	15.25	16.00	....	16.00

Bucket dredger shell hoists in the ammunition passages are a novelty that has been fitted to the English battle ship King Edward VII. These hoists are operated by electric motors, upon the same mechanical principles as marine dredges. The difference in detail is that the bucket is halved, and consists of a bisected steel cylinder, slightly larger in diameter than the shell. A pedestal is fitted on the ammunition passage flat, which is geared to the electric motor, and the base is exactly fitted to receive the bottom of the shell. Directly the shell is placed in position steel clips attached to the half buckets retain it there, and by means of an endless chain and recurring buckets a constant supply is delivered to the gun crews. Hand gear is also provided, for use in case the electric gear should become disabled.

The Machinery Trade.

NEW YORK, September 6, 1905.

A sure sign of the excellent state of the machinery trade is the talk heard in machine tool circles of a contemplated advance in prices, which from present indications will soon occur. Early in the summer, when business fell off slightly, there was some shading of prices, but the demand for mechanical equipment held up so well during the hot weather and has increased to such an extent within the past few weeks that this has in most instances already been eliminated and a substantial advance in prices can be looked for. Having been practically cleaned out of tools in stock long ago by large orders for quick delivery, since which time the demand has necessitated the operation of their plants to capacity, machine tools builders have been unable to accumulate the necessary stock to anticipate the fall trade. Now the manufacturers find themselves without sufficient stock and orders so far ahead that deliveries on some lines cannot be made for a couple of months. Owing to the persistent efforts of American manufacturers foreign trade is becoming an important factor in this market and will undoubtedly in the near future result in a considerable expansion. One of the large machine tool builders has just received a cable order from Italy for some 40 odd lathes.

The demand for large power units has been given quite an impetus by the decision of some of the leading railroad systems to electrify part of their lines to handle suburban traffic, and as the other roads perceive the advantages of electrical operation they will no doubt change over from steam. The result of electrification has been the establishment of large central power plants, which have called for the purchase of great quantities of power plant equipment. In speaking of the building of power plants for great undertakings, one who is in a position to know intimates that the tendency will be to generate power in one central station instead of a number of smaller plants stretched along the lines. This will result in the building of plants of much greater capacity than those now in existence. This policy will not only be followed by the railroads, but by the lighting and power companies, some of which are already either equipping such central stations or drawing plans to do so. The construction of very large generating stations has to a great degree been made feasible by the successful operation of steam turbines of large capacity. It will be remembered that the Brooklyn Rapid Transit Company recently changed its order from 5500-kw. to 7500-kw. turbines, and now the New York Edison Company has purchased two 8000-kw. Curtis turbines. An important lighting company of the East which determined some time ago to install a 60,000-kw. turbo-generator plant of 12 units of 5000 kw. each, two of which have already been secured, has decided to install turbines of much greater capacity. The remaining ten turbines to be secured will be of 7000 or 8000 kw. capacity each, increasing the capacity of the plant when completed about 50 per cent. and giving it a capacity of over 100,000 kw. instead of 60,000 kw., as called for by the original plans.

The fact that the August Belmont interest has by no means abandoned plans to carry out the old Steinway tunnel project in order to establish direct connections between the Manhattan Subway and Queens County trolley lines is illustrated by the purchase several days ago by Mr. Belmont of nearly half a block of property in Long Island City, situated at the corner of West avenue and Fourth street, where it is proposed to sink the shaft for the construction of the tunnel. The Belmont interest now owns from the Long Island Railroad property on the river front back to Jackson avenue, where it is understood a large station will be erected for the tunnel car lines. Emil Calman & Co., manufacturers of varnish, occupy the site purchased by Mr. Belmont, and that firm has been given seven months in which to vacate. The carrying out of this tunnel project will mean a great deal to the machinery trade in New York, as it will entail a vast expenditure for machinery. The company has obtained the franchise permitting it to extend its tunnel as far west as Eleventh avenue on the New York side, where the river tunnel will be below that of the present Subway. The tunnel, according to the plans prepared so far, will be in most respects similar to those of the Pennsylvania Railroad Company under the North and East rivers, and will be constructed of cast iron rings, making it practically an iron tube. A reference to the tonnage of castings used in connection with the East River tube of the Pennsylvania Railroad will demonstrate what a large amount of castings will go into the Belmont tunnel. The Pennsylvania tunnel required about 120,000 tons, but that consisted of four tubes, where, according to present plans, the Belmont tunnel will consist of but two tubes, and it is likely that the successful contractor will come into the market for some 60,000 tons. There will no doubt be large purchases of boilers, engines and air compressors, shields, hydraulic machinery, pumps and the like.

Machinery Requirements.

We understand that the Lehigh Valley Railroad is about to issue specifications for a large number of machine tools

for its shops at Sayre, Pa. It has been known that the engineering department has been preparing specifications for some time and from the hints given out in the trade this past week it is evident that the list is about completed and ready for distribution. For some time past the company has been getting figures on quite a number of motors for these shops, some of which have been purchased. It is well known that these new shops, for which the company bought about \$125,000 worth of machine tools some six or eight months ago, are nowhere near completely equipped. The shops when completed will have cost over \$1,000,000 and include, besides several other buildings, a locomotive shop, 366 x 750 feet, and a blacksmith shop, 103 x 360 feet.

The Chicago Pneumatic Tool Company, New York, is gradually buying the machinery for equipping the proposed extension to its air compressor works at Franklin, Pa., and has recently placed orders for about \$20,000 worth of machinery in the Pittsburgh district. There is a great deal more machinery yet to be purchased and the orders will be placed from time to time for small lots, the company having decided not to issue a list of tools it expects to buy. The plans for the proposed new buildings have not yet been completed, but it is expected that as soon as Messrs. Duntley and Schwab return from Europe the matter will be taken up and the contracts let for the new buildings shortly thereafter. Since taking an option on the plant of the McKiernan Drill Company at Dover, N. J., the company has sold the entire capacity of the plant for some months to come. An order from Cuba was recently secured for 25 rock drills. The option the company has on the McKiernan plant expires October 1, but it is likely that the business will be taken over before that date, and there is very little question that the plant will be considerably enlarged as soon as the Chicago company takes possession. An order has just been received from the Panama Canal Commission for a 2000-foot air compressor and one from the Chesapeake & Ohio Railway for a 1000-foot air compressor. The business of the Chicago Pneumatic Tool Company has very largely increased of late, particularly in the air compressor and rock drill departments, both of which are under the management of W. P. Pressinger.

The College of the City of New York has inquiries in the market for a number of tools for equipping its new buildings. The list upon which it is receiving bids calls for milling machines, planers, lathes and small tools and supplies.

The John A. Roebling's Sons Company, Trenton, N. J., has recently been placing orders for the equipment of its new Kinkora plant and will probably come into the market for some time for various tools. The order for the boiler equipment was placed with the Babcock & Wilcox Company, New York, and includes 4200 horse-power of water tube boilers.

The New Castle Forge & Bolt Company, New Castle, Pa., has not yet decided on the machinery which will have to be purchased for equipping the new building it intends to erect to replace the one recently destroyed by fire. The new structure will be of brick and steel, 100 x 440 feet, and will be fire proof throughout. The company is at present erecting a temporary structure which will enable it to resume operations and commence filling orders within a few weeks.

The American Smelters Securities Corporation, New York, which recently took over the plants of the Guggenheim Exploration Company, is receiving bids for the construction of large copper rolling mills and wire drawing plant to be erected in the harbor of San Francisco, Cal. This plant will not only supply the trade of the Western coast, but that of the Far East, it being the intention of the company to reach out after the trade of China and Japan.

Many of the copper mines of the West have recently purchased a great deal of electrical machinery for operating their plants. The Bully Hill Copper Mining & Smelting Company, in Shasta County, Cal., is installing electric pumps and hoisting machinery. The company intends to build a 12-mile railway to its mines for handling its output of copper.

The Continental Iron & Steel Company, 66 Broad street, New York, has purchased a site at Rahway, N. J., for the erection of a factory and the construction of a storage yard. Just what the company intends to manufacture at Rahway has not yet been announced.

Power and Municipal Work.

Plans have been completed for the new terminal of the Delaware, Lackawanna & Western Railroad in Hoboken, N. J., and work will be begun on the structure shortly. Judging from the preliminary plans a considerable amount of machinery will be required. The terminal will cost about \$3,000,000, and it is believed that the new station will be in use within 18 months. The improvements comprise six ferry slips besides a station structure and the construction will be of steel and cement. A number of elevators will be installed, and there will be a power plant of about 1000 horse-power. The new terminal will be 600 feet long on the river side and an electrically illuminated tower will surmount the station. It is understood that none of the machinery has been purchased as yet, and the power plant equipment will in all probability be purchased in the New York market, as the engineering force at Hoboken will have charge of those arrangements.

It is announced from Burlington, Vt., that the motive power of the Keesville, Ausable Chasm & Port Kent Railroad is to be changed from steam to electricity, the third-rail system having been decided upon.

The machinery trade will be considerably interested in the statement that the New York Edison Company has established a record in the matter of the size of steam driven units for its new Waterside power house. Two Curtis steam turbine generating units, which are to be the largest ever turned out by the General Electric Company, have been ordered from that concern. The units are rated at 8000 kw. capacity each and capable of developing continuously 9000 kw. The floor space occupied by these turbines will be a circle 15½ feet in diameter. It is understood that the machines have been ordered for early delivery and the work of equipping the Waterside plant will be hurried. The Edison Company has placed a number of small contracts of late for the Waterside plant and it is probable that there will be some orders to come, although it has been stated that the majority of the machinery has been bought.

The Board of Water Commissioners of Burlington, N. J., will receive bids until September 19 for a compound condensing crank and fly wheel pumping engine of 3,000,000 gallons capacity.

The Babcock & Wilcox Company, New York, has recently received orders for many large boiler installations, including South Side Elevated Railroad Company, Chicago, Ill., 4000 horse-power; American Smelting & Refining Company, Perth Amboy, N. J., 800 horse-power; Pennsylvania Steel Company, Steelton, Pa., 530 horse-power; Philadelphia & Reading Coal Company, 1200 horse-power; Commonwealth Electric Company, Chicago, Ill., 8200 horse-power; Whitaker-Glessner Company, Wheeling, W. Va., 800 horse-power; Lake Shore & Michigan Central Railroad, 760 horse-power; Standard Steel Works, Burnham, Pa., 600 horse-power; Latrobe Steel Company, Latrobe, Pa., 2100 horse-power; Dilworth, Porter & Co., Pittsburgh, Pa., 500 horse-power; Ansonia Brass & Copper Company, 560 horse-power; American Locomotive Works, 1200 horse-power; Pennsylvania Railroad Company, Altoona, Pa., 3092 horse-power; Pennsylvania Railroad Company, Camden, N. J., 1024 horse-power; American Bridge Company, Ambridge, Pa., 530 horse-power; Oliver Iron & Steel Company, Pittsburgh, Pa., 400 horse-power; Washington Navy Yard, Washington, D. C., 1600 horse-power; Consolidated Gas, Railway & Power Company, Baltimore, Md., 5600 horse-power; Cambria Steel Company, Johnstown, Pa., 2400 horse-power; International Steam Pump Company, Harrison, N. J., 1000 horse-power; Indianapolis & Cincinnati Traction Company, 1750 horse-power; National Malleable Castings Company, Chicago, Ill., 906 horse-power; Erie Railroad, for Hornells-ville shops, N. Y., 1600 horse-power.

New England Machinery Market.

WORCESTER, MASS., September 5, 1905.

Business continues to improve, and still greater improvement is looked for immediately. The whole situation may be summed up in the statement that every one in the machinery line, both manufacturer and dealer, seems perfectly happy.

The National Steel & Wire Company contemplates radical improvements and enlargements at its plant at New Haven, Conn. The existing works are experiencing material changes with a view to increasing the output, a condition that has been already effected to a considerable extent during the past few weeks. Large extensions are planned, work upon which will probably begin immediately. The management of the New Haven works has been changed. Herbert Smith, late with Dorman, Long & Co., Limited, Middlesbrough, England, has been made general superintendent of both the works of the National Wire Corporation and the National Steel Foundry Company, which are constituent parts of the National Steel & Wire Company. Mr. Smith has been with Dorman, Long & Co., Limited, for the past six years, and for 16 years previous was with the Washburn & Moen Works at Worcester as head of the barb wire and specialties. E. H. Parker, another Washburn & Moen wire man, has become Mr. Smith's assistant at New Haven. Mr. Parker was superintendent of the South Works at Worcester when he resigned to go with the Washburn Wire Company, Providence, R. I. It is proposed by the new management to increase the capacity of the New Haven works 50 per cent.

The works of the American & British Mfg. Company at Providence, R. I., and Bridgeport, Conn., are very busy. At Providence orders for Diesel engines aggregating \$500,000 are on the books. At Bridgeport orders for \$1,400,000 worth of ordnance are in the works. The American & British Mfg. Company is making extensive experiments in developing the Wilkinson steam turbine.

The Connecticut Computing Machine Company, New Haven, Conn., recently organized under Connecticut laws with a capital stock of \$600,000 to manufacture the Connecticut arithograph, has not yet decided where it will locate

its factory, but New Haven will probably be chosen. The work of organization is proceeding, Col. Rollin S. Woodruff, New Haven, being the prime mover. The incorporators, whose names have already been printed in *The Iron Age*, comprise prominent officers of the American Brass Company of the Naugatuck Valley and the hardware interests of New Britain as well as other prominent and wealthy business men of the State. The arithograph is the invention of Fred. M. Carroll, New Haven. It adds and subtracts numbers, prints them, together with month and date and any desired words or their abbreviations employed in accounting. The figures or words to be printed appear to the eye before they are recorded by the action of an electric contact, and also the totals of figures added or subtracted. A number of important improvements are claimed. The machine resembles a typewriter in form and size. Manufacturing will be pushed conservatively, but in the establishment of a factory a considerable amount of machinery and other equipment will be required similar to those of a typewriter factory.

The William Schollhorn Company, New Haven, Conn., manufacturer of pliers, nippers, punches and other small tools, will require considerable machinery for the addition to its shop, already noted in *The Iron Age*. The principal item will be presses.

The Dumas Corporation, Ware, Mass., recently organized for the manufacture of children's express carts and sleds, will require an entirely new outfit of planers, saws, lathes and other necessary equipment for a factory. The company has a capital stock of \$10,000 and Joseph Dumas, Jr., is the president and treasurer. An existing three-story building will be occupied as a factory.

The W. A. Hardy Brass Foundry Company, Fitchburg, Mass., manufacturer of railroad supplies and screen plates for paper mills, has purchased a tract of land at South Fitchburg, where it is proposed to erect a large modern plant. A shop for the manufacture of screen plates will be erected this season, the building to be 250 feet long, a part of it three stories, the remainder one story. A light traveling crane will probably be installed and a compressed air plant. Electric power will be purchased, only about 30 horse-power being required. Later the company will erect a foundry at South Fitchburg, but this will not be this year and probably not next.

The factory at Portland, Conn., formerly occupied by the National Enameling & Stamping Company, has been leased by the New England Enameling Company, Middletown, Conn., which company will operate it as soon as the necessary installation of machinery and furnaces can be made. The company manufactures enameled ware and has grown very rapidly since its establishment three years ago. Its principal plant at South Farms, Middletown, has been enlarged several times, including material additions this season, but the capacity is still insufficient, which led to the leasing of the Portland factory.

The Hamilton Emery & Corundum Company, Chester, Mass., manufacturer of Turkish and Naxos emery, is to build an addition to its plant, to be 30 x 50 feet and three stories. The new building will be devoted to a general expansion of the business, the capacity to be increased about 25 per cent. by the introduction of up to date equipment.

The Confectioners' Machinery & Mfg. Company, Springfield, Mass., has been incorporated under Massachusetts laws with a capital stock of \$400,000. The officers are: President, Frank H. Page; vice-president, C. A. Crocker; treasurer, H. H. Bowman; secretary, G. C. Baldwin, Jr.; directors, these officers and G. Carlson, all of Springfield, and T. C. Page and W. M. Alden, Chicopee, Mass. The incorporation means no change in management, but carries with it an increase in capital stock. An additional story will be given to the plant.

The Rowbottom Machine Company, Waterbury, Conn., manufacturer of special and automatic machinery, is adding to its plant a one-story shop building, 40 x 80 feet.

The W. A. Choate Mfg. Company has voted to purchase the property formerly occupied by the Readboro Chair Company, Wilmington, Vt., and will erect a factory on the site to be 50 x 120 feet and two stories. The company will manufacture school seats. There will also be a saw mill and dry kiln in separate buildings. Both steam and water power will be used.

The plan for developing water power on the Farmington River, in Massachusetts near the Connecticut line, has progressed substantially, surveys having been completed by H. T. Keith, Mount Washington, Mass. The dam will be 40 feet high, and from it the water will pass in an iron pipe down the river to New Boston, Mass., where the power house will be located. The total fall in the 4 miles is 350 feet, which added to the power at the dam itself will develop between 4500 and 5000 horse-power. It is proposed to transmit this power to Springfield, Mass., and Hartford, Conn.

ALBERT M. EDDY, secretary and treasurer of the R. M. Eddy Foundry Company, Chicago, died suddenly September 3. He leaves a widow and one son.

Chicago Machinery Market.

CHICAGO, ILL., September 5, 1905.

A large volume of business has been transacted during the last week, including the purchase of heavy boring mills and other tools to the amount of \$20,000 by the International Harvester Company and fairly heavy purchases by railroads. The bulk of the week's business, however, has come from the general machine and foundry trades, and is made up of a multitude of orders, large and small, from a wide area of territory and a great diversity of interests. The fact that makers of machine tools, notably boring mills, are several months behind their orders is leading to a steady increase in the sale of tools and machines from the floors of the local houses. There is even a possibility that the strenuous times of the winter of 1902-1903 may be repeated the coming winter, and that owners of even second-hand tools of certain styles and makes may be able to secure higher prices than are charged under ordinary conditions for new tools, simply because they can be delivered. This condition has not yet arrived by any means, and it may not occur at all.

A large number of new shops and industries calling for tools are being established in the West. One of the large new industries proposed for the Chicago district is a copper rolling mill at Indiana Harbor. Two new blast furnace projects by Western pig iron interests and a blast furnace and seven open hearth furnaces by the Illinois Steel Company are also assured for immediate construction. Industrial activity for the Chicago district is the greatest at South Chicago, East Chicago, Indiana Harbor and Chicago Heights, and the tendency of industrial affairs is away from the congested center of the city to the outskirts and to suburbs within 50 miles radius.

Large Copper Plant Projected.

A large project on foot, which will require considerable equipment, is the Western Copper Mfg. Company, recently organized with E. C. Potter, 461 Rookery Building, as president. More than \$750,000 probably will be expended in real estate, buildings and equipment at Indiana Harbor, Ind. The company has purchased 10 acres of land on the west side of the Indiana Harbor Railroad and just north of the Chicago Terminal Transfer Company's line. A sheet mill for making brass and copper sheets will first be erected, which, together with a power house, will involve an expenditure of \$200,000. The sheet mill will have a capacity of 18,000 tons a year. Later a tube mill and a bar mill will be constructed, each to cost \$250,000. Details of dimensions of buildings and equipment to be purchased are now under consideration, and will probably not be available for ten days or two weeks.

Julian Kennedy of Pittsburgh will shortly be in the market for machinery and supplies necessary for the erection of a new blast furnace for Pickands, Brown & Co., Chicago, and also the new stack to be added to the Northwestern Iron Company's plant, at Mayville, Wis. Engineers have not yet been selected for the blast furnace to be built by Rogers, Brown & Co.

Equipment for the new \$500,000 Detroit plant of Morgan & Wright, Chicago, Ill., will consist of the following: Ten 250 horse-power Wickes vertical boilers, equipped with Rooney automatic stokers; two 1000 horse-power cross compound condensing engines built by the Westinghouse Machine Company; two Edwards air pumps with Wheeler condensing apparatus furnished by the Wheeler Condenser & Engineering Company; one 75-kw. direct connected Westinghouse engine and generator for electric lighting, one 150-kw. belted generator for lighting, one steam driven class FC air compressor and one steam driven class H air compressor furnished by the Ingersoll-Sergeant Drill Company; power transmission of machinery will be rope driven entirely, furnished by the Dodge Mfg. Company, Mishawaka, Ind.; coal conveying and coal storage hopper, furnished by the C. W. Hunt Company; traveling crane running full length of walls in main engine room, furnished by the Northern Engineering Works, Detroit, Mich.; main engines, generator engines and compressor engines equipped with Cochrane separators; boiler house equipped with Colles feed water heater and one Warren and one Snow boiler feed pump. The power house will also contain two 2000-pound hydraulic pumps and two 1000-gallon 200-pound pressure pumps for supplying factory buildings, all of which have been purchased. This plant will comprise seven separate buildings.

The Paynter Longwall Mining Machine Company, Topeka, Kan., will build a new machine shop in the near future for the manufacture of a newly invented mining machine and other devices. When ready to buy equipment the company will need a planer, drill press, lathes, miller, shaper and other small tools required in a machine shop.

J. D. Wallace, Champaign, Ill., has purchased a tract of land 260 x 320 feet and will erect thereon a building for the manufacture of power sprayers. Iron working machinery and an elevator will be required.

The Weir & Craig Mfg. Company, Chicago, Ill., will within the next few days commence rebuilding the part of its plant which was recently destroyed by fire. The engines and boilers were not destroyed and the company is able to

operate the portion of the plant which was not burned. As soon as the new building is erected the company informs us that it will probably be in the market for some lathes, milling machines, drills, presses, &c., to replace the machines destroyed.

Holabird & Roche, Monadnock Block, Chicago, have been selected as the architects for the erection of the new County Court House in Chicago. Present plans call for the expenditure of \$3,500,000, but the total cost is likely to approach \$5,000,000, and the latter sum was authorized by a vote of the people. The building will consume between 8000 and 10,000 tons of steel and will require an extensive power, heat and lighting plant, ventilating system, &c. It has not yet been decided whether the whole construction will be awarded to some one large contracting firm or whether the county officials will decide to award a multitude of subcontracts. Present estimate is that three years will be required to complete this structure.

Cincinnati Machinery Market.

CINCINNATI, OHIO, September 5, 1905.

The past week has shown no decline in the manufacture of machine tools in this city and the month just closed has been far above the average. August, generally speaking, has come to be regarded as the most quiet month of the year, but with all the shops running full complements of men and a number of them working extra hours it is very clearly shown that the year has been an exceptional one. That the heavy buying of Japan in the earlier months of the year has largely accounted for this activity there can be little doubt, as at that time the entire stock on hand, especially lathes, went for the manufacture of projectiles. With peace assured and matters in a fair way for speedy settlement Government contracts will give place to general business enterprises, and it is reasonable to expect that both Russia and Japan will develop wonderfully in a manufacturing line and thus open the way for tools of American design. In confirmation of this we are informed by one of the large lathe concerns of the city that it is in receipt of a communication from one of the large interests in Japan in which it states that peace was in a measure anticipated and that it expects heavy developments along the line of manufacturing and that the result will be a very large trade with this country in supplying the demand for machinery of every description.

The Bullock Mfg. Company has let the contract for an addition to be built to its shop No. 3. This new structure will be 105 x 250 feet, two stories high. It will be utilized as a machine shop for the manufacture of machines along new lines, such as auto starters, transformers, controllers and switchboards. The building will be equipped throughout with a new line of tools, which, as we learn, have not as yet been secured. The company is now building two large generators of 2500 kw. each for the Consumers Electric Company, New Orleans; 5500-kw. steam turbo-generator for the Brooklyn Elevated Railway Company; two vertical generators of 500 kw. each, to be coupled to hydraulic turbines for the Concord Electric Company, Concord, N. H.; two 1000-kw. generators, A. C., for San Joaquin, Cal. It is also building a large generator for municipal lighting purposes to go to Cebu, Philippine Islands. Trade is said to be far ahead of what it was several months since. An industrial railway has been put across the street connecting the foundry and pattern buildings with the main plant.

The Houston, Stanwood & Gamble Company is reorganizing. Articles of incorporation have been granted it at Columbus, Ohio, for a company with \$200,000 common stock and \$200,000 preferred stock. Part of the proceeds of the preferred stock is to be used in purchasing about 7 acres of ground in the city of Covington, most of which the company is now using for its manufacturing plant, and for erecting a structural iron building and equipping same with tools for the manufacture of boilers. The remainder of the proceeds of the preferred stock is to be used as additional working capital. The business of the company has been very profitable for a number of years and it is rapidly becoming one of the foremost manufacturers in its line. The organization of the new board will take place in a few days. The management of the business, however, will remain as it has for a number of years—C. R. Houston, vice-president and general manager, and J. B. Stanwood, engineer. The company reports the business for the year to date the largest in its history. The South, from which a large percentage of its trade comes, is at present said to be somewhat less active, due to yellow fever conditions. The company is now working night shifts in order to make deliveries required. It has recently added several new tools and will in the near future provide additional facilities for more extensive manufacturing.

The Fosdick Machine Tool Company has been incorporated with an increase in capital from \$60,000 to \$100,000. William Herman is president and L. C. Twachtman, secretary and treasurer. The directors and stockholders

are P. Fosdick, William Herman, L. C. Twachtman, John A. Oberhelman and Judge Herman P. Goebel. Mr. Fosdick, who for a number of years has been the head of the concern, announces that he has relinquished the direct management of the plant. He will still remain the largest individual stockholder in the company. Some expansion along general lines will be made in the near future. Present facilities are said to be inadequate to take care of the large bookings and some action must be taken to secure this end.

The Dreses Machine Tool Company says that the general state of trade compared with previous months is some better. A fair percentage of this increase is of foreign origin and is increasing.

Cincinnati Machine Tool Company has shipped three of its large 32-inch complete patent geared tapping attachment and compound table drills to Panama for work on the canal. Trade is said to have been a little less active the past month, with inquiries for the coming fall on the increase.

The Oesterlein Machine Tool Company says that it has redesigned all its tools since moving into its new building, and orders now being shipped are filled by machines of new design. Three cutter grinders and three milling machines were recently shipped for Panama Canal work. Trade is reported as showing a falling off in August.

L. Lowenberg, for six years with the Bullock Electric Company, has severed his connection and established the Reliance Engineering Company. This is a firm of consulting and constructing engineers, which will install modern isolated and power plants. It will also make a specialty of writing up specifications for direct driven machine tools, particular attention being given to the economic conditions both as regards installation and operation.

The American Tool Works Company advises that trade is in a more stable condition and everything is busy in mechanical lines. Most of the orders received are from manufacturers direct and are widespread. The company finds it necessary to run until 9 o'clock each night in order to take care of trade. It has been crowding space somewhat and has installed \$10,000 to \$15,000 worth of new machinery during the year.

The I. & E. Greenwald Company says that the gear trade is heavier than it has ever been, showing that millwright business throughout the country is very active. Considerable movement is also manifest in the coal washer business, while the demand for engines is a little more quiet.

The Cincinnati Iron Fence Company, now located at 118 West Second street, this city, has purchased ground on Spring Grove avenue for the erection of a large plant. This building will be 110 x 200 feet, two stories high. It is understood that considerable new machinery is to be installed and the factory hurried to completion. Clarence Lebus is president of the company and hopes to have the new building ready for occupancy by December. The move is said to have been necessary, as present quarters were too small to handle the increasing trade.

The Norwood (Ohio) Automobile Company has been incorporated, with \$25,000 capital, by J. H. Schneider and others.

The Dayton Vulcan Foundry Company has been incorporated, with \$10,000 capital, by Hugo Cook and others.

Philadelphia Machinery Market.

PHILADELPHIA, Pa., September 5, 1905.

The local market during the past week has been more or less of a spotty nature, and while the volume of business transacted has been fair it has been rather irregular. In some branches of the trade an increase over the amount of business done during the previous week is to be noted; in others it has diminished, but on the whole it has been fairly satisfactory, particularly when it is recalled that it is not only the tag end of the summer vacation period, but also the end of the month, which as a rule is rather unproductive in new business.

What the month of September will bring out in the way of new propositions requiring heavy purchases of machinery and tools is somewhat problematical. A large amount of business has no doubt been held up during the summer months, and the trade generally looks forward to early activity in all branches.

The railroads have had small lists out from time to time during the summer, and it is expected that specifications for some extensive purchases will now be on the market before a great while. The Pennsylvania Railroad, which placed orders some time ago for 5000 freight cars, will likely place further orders for some 10,000 additional, mostly steel cars, at no distant date. The Philadelphia & Reading, with its extensive new shops at Reading, Pa., is more or less continuously in the market for tools and machinery, orders developing as fast as the improvements and additions are completed. Another large buyer of tools, the Baldwin Locomotive Works, is in the market for tools and other equipment almost all the time, and with the building of additional shops, which have recently been mentioned in these columns, will be in

need of quite a lot of tools both for new equipment and for replacement.

The textile manufacturers have also come in for considerable attention from both machinery merchants and manufacturers recently. Extensive plant improvement as well as new plants have been built for the manufacture of textiles, and while a good many orders have been taken for both machinery, tools and power plants, there is still quite a large proportion of equipment which is yet to be estimated upon.

There is a slight improvement to be noted in the foreign demand. While orders are not being received for large quantities of tools, there is a greater number of inquiries in the field, and orders for one or more tools to different countries have been taken by several manufacturers. Those transacting a regular established business abroad in various specialties report unchanged conditions, orders being received in good numbers but for smaller quantities than some months ago.

Considerable interest is being taken in the display of street railway supplies and equipment which will be made in conjunction with the annual convention of the American Street Railways Association in this city September 25 to 30, at the Philadelphia Commercial Museums. This display will be under the auspices of the American Street Railway Supplies Association and will include all branches of supplies and street railway equipment. The exhibition will, it is believed, be open to the public, while many topics of interest will be taken up and discussed by the convention. The officials of the Street Railway Association are W. Caryl Ely of New York, president; Edwin C. Foster of New Orleans, first vice-president; John I. Beggs of Milwaukee, second vice-president; Richard McCulloch of St. Louis, Mo., third vice-president; T. C. Pennington of Chicago, secretary and treasurer.

The Link-Belt Engineering Company has taken a number of orders for coal handling machinery during the last few weeks, for use with both anthracite and bituminous coal. A large boiler house equipment, including coal handling and storage machinery, will be installed for the Latrobe & Conifellsville Coal & Coke Company at Latrobe, Pa., as will also a coal elevating apparatus for handling coal from boats for the American Ice Company of this city. There is also a good demand for sugar and cane and for phosphate handling machinery. General orders, it is said, are very good and prospects for future trade excellent.

The Standard Pressed Steel Company is making steady progress with its American Pioneer steel shaft hanger both in the foreign and domestic field. Agencies have recently been established in England, France, Germany, Belgium, Holland, Norway, Sweden and Denmark and in Austria-Hungary. There has also been an increased sale of hangers in Canada and in South America. The local demand is particularly good and shipments of various sized hangers are being made to all parts of the country as well as for export to the various agencies.

The American Pulley Company notes an increase in business both from foreign and domestic sources. Recent orders from abroad include one for 1000 pulleys for shipment to New Zealand and smaller orders to London, Switzerland and Paris. The local and nearby demand has increased materially, as has also that from the South and the Pacific Coast. This company has increased its facilities for the manufacture of pressed steel sash sheaves, which are now being made in 2, 2¼, 2½ and 3 inch sizes. The company finds a large sale for these new sheaves, which are meeting with particular favor in all sections of the country.

Thos. H. Dallett & Co., Incorporated, is very busy, the past month being the best individual month in point of orders received that this company has had during the past year. It notes a largely increased demand for electric and rope driven portable drills, as well as for stone working and pneumatic tools. Boiler makers, structural iron workers and large steel plants have been taking the larger proportion of the former, while the stone working industry has placed orders for a large number of the latter tools. Deliveries on both lines have been numerous and include points in all parts of the United States.

The Newton Machine Tool Works notes an increase in the number of inquiries received for its various lines of machine tools. Export demand has improved and domestic business is again inclined toward the heavier type of machines. Orders are being taken recently in good quantity, and include three No. 2 and one No. 1 combined cold saws, two No. 2 steel foundry saws and two bar saws, four automatic saw sharpening machines, a special hydraulic slotter, two rotary planing machines, one being portable and one mounted on a round base, the former for a bridge building and the latter for an electrical manufacturing company in the West; two double spindle boring machines, one vertical and one horizontal, from Southern purchasers, and a four-spindle combined vertical and horizontal boring machine from New York parties. The Newton Works is making very extensive deliveries on cold saws, bar, combined, steel foundry and crank pin saws being shipped to all parts of the country. A special heavy centering machine has been delivered nearly

parties, while a steel foundry shaper has been shipped to purchasers in Delaware. Two No. 1 key seat milling machines have been exported to England, two rail drilling machines to Canada, and a duplex milling machine to Russia. A horizontal boring and drilling machine and a No. 4 vertical milling machine have been delivered to one of the large railway shops, while a locomotive cylinder boring machine has been shipped to a large mining company for use in its own repair shop.

The Bond Foundry & Machine Company, Manheim, Pa., which was recently incorporated with a capital of \$40,000, has purchased the plant of the late Greer Clarkson Machine Company of the above place. The plant will be immediately prepared for the manufacture of power transmission machinery and machine supplies, particularly the Bond hanger, which has been manufactured for a long time by Charles Bond of Philadelphia, Pa., who is also president of the new company. H. H. Shenck is secretary, and Morgan T. Williams manager of the plant. This company will in the near future be in the market for various machine tools, but for the present has not decided what plans will ultimately be followed.

Government Purchases.

WASHINGTON, D. C., September 5, 1905.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until October 10 for the following machinery for the Boston, New York, League Island and Pensacola navy yards: Schedule 122, track scale and rock crushing plant; schedule 123, boring and drilling machine; schedule 124, lathes, engraving machine, milling machine, drill presses, magnetic metal separator, hydraulic shaft straightening machines, band saw, planer and jointer, steam hammer, pipe bending machines, drilling and boring machines, boring and turning mill and radial drill.

The following bids were opened August 29 for supplies for the various navy yards:

- Bidder 8. Alliance Machine Company, Alliance, Ohio.
- 12. Berger-Carter Company, San Francisco, Cal.
- 17. E. W. Bliss Company, Brooklyn, N. Y.
- 55. Edward J. Elting, Philadelphia, Pa.
- 80. Harron, Rickard & McCone, San Francisco, Cal.
- 81. Henshaw, Bulkley & Co., San Francisco, Cal.
- 108. Manning, Maxwell & Moore, New York.
- 109. J. C. Martin & Co., San Francisco, Cal.
- 114. Morgan Engineering Company, Alliance, Ohio.
- 126. Niles-Bement-Pond Company, New York.
- 186. Tatum & Bowen, San Francisco, Cal.
- 189. Tate-Jones & Co., Incorporated, Pittsburgh, Pa.

Schedule No. 49.

Class 1. Six portable oil rivet forges—Bidder 12, \$570; 81, \$744; 108, \$570; 109, \$708; 186, \$591; 189, \$690.

Class 2. One magnetic separator—Bidder 12, \$345 and \$256; 55, \$250, \$360, \$200 and \$300; 80, \$357.75; 81, \$323; 108, \$305.

Class 3. One 2500-pound double frame steam drop hammer—Bidder 8, \$3465; 81, \$2778; 108, \$3060; 114, \$3050; 126, \$3400.

Class 4. One geared trimming press, motor driven—Bidder 17, \$1900; 80, \$1900; 81, \$1620; 108, \$1240.

Class 5. One tube cutting off saw—No bids.

Class 6. One automatic railway cut off saw, complete—Bidder 80, \$752; 108, \$731; 186, \$655.50.

Bids were opened at the Bureau of Yards and Docks, Navy Department, for coal storage and coal handling plant, naval station, Olongapo, P. I., as follows:

The Snare & Triest Company, New York, item 1, \$500,000, conditional; 2, \$500,000, conditional; 3, \$500,000 conditional; 4, \$500,000, conditional.

J. G. White & Co., Incorporated, New York, item 1, \$499,500, conditional.

Under bids opened August 8 for supplies for the various navy yards class 52, schedule No. 40, two sectional water tube vertical headed boilers, has been awarded to the Babcock & Wilcox Company, New York, at its bid of \$7307.

Under bids opened June 20 for supplies for the various navy yards the Buffalo Forge Company, Buffalo, N. Y., has been awarded class 21, one three-stage turbine pump, at its bid of \$610.

The Tonawanda Transit Company last week closed a contract with the American Shipbuilding Company for the construction of the largest freight vessel on the lakes, to be completed at the Lorain yards by May 1, 1906. It will be of steel construction, 570 feet long, 56 feet beam and 31 feet deep, with a displacement of 12,000 tons, and will cost \$425,000. The vessel will carry ore from Lake Superior ports to the Buffalo & Susquehanna Iron Company's plant in Buffalo. The new boat will be named Charles Weston and will hail from Buffalo.

Pickands, Brown & Co.'s New Blast Furnace.

Announcement has been made in these columns of the fact that Pickands, Brown & Co., Chicago, would erect a blast furnace in the Chicago district, but the exact location of the new plant has not been decided upon until recently, owing to the difficulty of securing title to the large number of individually owned building lots on the proposed site. Title has at last been perfected by William L. Brown for the company in 23½ acres of land on the east bank of the Calumet River, between 108th and 109th streets. This property is immediately across the river from the South Chicago furnaces, which were built by the same firm and before their completion sold to the Deering Harvester Company and diagonally across from the new 120-oven by-product Solvay coke plant that will be operated by the By-products Coke Company of Syracuse and Chicago. It is also ten blocks due north of the steel works of the Grand Crossing Tack Company. The Calumet River is navigable and in connection with the excellent harbor at South Chicago will afford ready ingress and egress of raw materials and finished product. Means will be provided for conveying coke across the river from the by-product ovens to the new blast furnace. The blast furnace itself will at first consist of only one stack of 275 to 300 tons daily capacity, though foundations will be laid for a second stack. The equipment will include four stoves, a 1600 horse-power boiler and engine plant, with the most modern system of blowers and accessory machinery. Bids on this machinery equipment are now being taken by Julian Kennedy of Pittsburgh, who is also getting estimates on a somewhat smaller equipment for the new stack and equipment at Mayville, Wis., of which Pickands, Brown & Co., are the principal owners. An operating corporation for the South Chicago furnace will be formed of which Pickands, Brown & Co., Chicago, and Pickands, Mather & Co., Cleveland, will be the principal owners. William L. Brown, Chicago, will be president. It is the hope of the builders that the plant may be in operation by next July.

The concrete work on the west basin of the Jerome Park Reservoir, New York City, is nearly finished. The area of this basin is 93 acres and it is being lined with concrete 6 inches thick, made by a battery of 18 Ransome concrete mixers. The mixers are mounted on trucks and are readily moved as the work progresses. The stone is delivered to the mixers in flat cars and is shoveled from the cars into Ransome charging hoppers. This is probably the largest number of concrete mixers ever engaged in work at one time on a reservoir. When the contractor, William Bradley of New York City, has finished the west basin he will begin upon the east basin, which covers 160 acres.

It has been proposed to enlarge the scope of the existing agreement between the producers of boiler and ship plates in the North of England and the West of Scotland so as to include angles, tees, channels and other sections. Heretofore the Midlands have been free territory, but there is an effort now to include that district in the price agreement. The present arrangement has not been entirely satisfactory owing to the advantage possessed by companies rolling both plates and shapes over those rolling only plates. There have been intimations that while plate prices have been maintained according to agreement, sharp cuts have been made on the angles, tees and channels that have been bought along with plates in a number of contracts. Such intimations have not been unknown in connection with the practical workings of pools in the United States in former years.

In a recent issue of *The Iron Age* an article was printed which referred to Reeves & Co., Columbus, Ind., as automobile builders. We are advised that Reeves & Co. manufacture threshing machinery exclusively. The Reeves Pulley Company, a separate corporation, manufactures automobiles.

New York.

NEW YORK, September 6, 1905.

Pig Iron.—There has been a fair degree of activity in Foundry Iron in this district and quite a number of good sales have been effected. Buyers show a disposition to keep their operations quiet. Standard Irons are very well sold up, but there is some accumulation of off grades, which are being pressed for sale in some quarters. We quote for Northern Irons, at tidewater, \$16.75 to \$17 for No. 1 Foundry, \$16 to \$16.50 for No. 2 Foundry and \$15.50 to \$15.75 for No. 2 Plain. Southern Iron is selling on the basis of \$15.50 to \$16 for No. 2 Foundry, New York harbor.

Steel Rails.—The activity in booking for 1906 delivery which has characterized the Western markets is beginning to spread eastward. During the past week the Reading Railroad placed an order for 15,000 tons, the Tidewater Railway 8000 to 10,000 tons and the Atlantic Coast Line 15,000 tons. The Pennsylvania Railroad and the New York Central are in the market and are expected to place their orders within the next two weeks.

Cast Iron Pipe.—New York City will open to-day bids on 4000 tons of Small Pipe for Manhattan and Brooklyn, as noted in last week's report. Richmond, Va., will also open bids on about 1000 tons. A great deal of Pipe is now wanted for delivery this fall. Foundrymen say that there has seldom been such a heavy demand so late in the summer. Although so much business is coming up, it is usually in moderate sized quantities. The most important matter in this connection which is now taking shape is the high pressure fire system for New York, which has so long been under consideration and for which it is stated preparations are being made to advertise for bids within two or three weeks. This work will take a very large quantity of good sized Pipe of a special quality, and it will probably be greater than any single foundry will be capable of handling satisfactorily. Prices are strong, with carload lots quoted at \$27 per net ton for 6-inch, at tidewater.

Finished Iron and Steel.—The limited volume of business in contracts for fabricated work during the month of August is demonstrated by the fact that the American Bridge Company booked orders during that period for only a little over 20,000 tons. It was the month of smallest business during the year. It is not likely that this experience will be repeated in September, as inquiries are not only large, but are steadily increasing. They come from all sections of the country and cover all classes of work. With the excellent condition of general business it is believed that these inquiries will crystallize into orders quite rapidly from this time forward and that the books of bridge builders and Structural Steel fabricators in general will quickly be filled. The mill demand for Structural Shapes continues strong and very little material can be had for anything like prompt delivery at even the advanced price made last week by the various manufacturers. Deliveries in this locality command about \$1 premium above the official price. The Eastern Plate mills have for some time been making very prompt shipment on orders received, but they are now getting an overflow from the West, where orders are running above the capacity of the mills, and the way seems to be clear to secure higher prices. Local business has been fair, with some round orders entered for Universal Plates for structural work. The Bar situation continues very satisfactory. Orders are being freely placed, especially for Bar Iron, and mills are in numerous cases getting premiums above the agreed price. Quotations at tidewater for shipment from mills are as follows: Beams, Channels, Angles and Zees, 1.89½c. to 1.99½c.; Tees, 1.94½c. to 2.04½c.; Bulbs, Angles and Deck Beams, 1.99½c. to 2.09½c.; Sheared Tank Plates, 1.74½c. to 1.84½c.; Flange Plates, 1.84½c. to 1.94½c.; Marine Plates, 1.94½c. to 2.04½c.; Fire Box Plates, 2.04½c. to 2.60c., according to specifications; Refined Bar Iron, 1.64½c. to 1.79½c.; Soft Steel Bars, 1.64½c. to 1.74½c.

Old Material.—While dealers have sold a great deal of Scrap of various kinds, much more business could have been done if holders had been willing to part with their stock at the prices ruling last week. An advance, however, has been made all along the line and sellers are now almost invariably holding for higher prices. The situation as to Steel Scrap, however, has not changed and business in this line has been limited owing to the persistent determination of buyers to endeavor to force prices lower. Sellers are confident of the future and are maintaining a firm front, believing that every day will make the necessities of the Steel works greater. It is believed that the railroad companies will not offer very large quantities of Old Material in the lists which they are now about to send out. If this proves to be the case the Scrap market will be further strengthened. Relaying Rails are exceedingly firm, large inquiries being in the market for various sizes of standard sections. Quotations for New York and vicinity are approximately as follows in gross tons:

Old Iron Rails	\$18.50 to \$19.50
Relaying Steel Rails	22.50 to 23.50
Old Steel Rails, rerolling lengths	14.50 to 15.50
Old Steel Rails, short pieces	14.00 to 14.50

Heavy Melting Steel Scrap	14.00 to 14.50
Old Iron Car Axles	20.00 to 21.00
Old Steel Car Axles	18.00 to 19.00
No. 1 Railroad Wrought	18.50 to 19.50
No. 1 Yard Wrought	15.50 to 16.50
Iron Track Scrap	15.50 to 16.50
Wrought Pipe	13.50 to 14.50
Ordinary Light Iron	9.50 to 10.50
Cast Borings	8.50 to 9.50
Wrought Turnings	11.50 to 12.50
Old Car Wheels	16.00 to 17.00
No. 1 Machinery Cast	14.25 to 15.25
Stove Plate	11.50 to 12.50

Metal Market.

NEW YORK, September 6, 1905.

Pig Tin.—On Thursday of last week there was a good demand at the lower quotation of 32.85c. This softening of prices was largely brought about by a decline of £1 on the London market following the announcement of the peace news there. Friday the market was nominally quoted at 32.40c., but this failed to attract customers. The Exchange holidays of Saturday and Monday resulted in an excellent inquiry on Tuesday, there being a very good business done, the quotations averaging about 32.50c. Consumers are buying in small lots, but the position is firm owing to the small stocks held in this country. The monthly statistics as issued by C. Mayer, secretary of the New York Metal Exchange, show as follows:

The total visible supply on August 31, 1905, is 92 tons above that of August 31, 1904.	Tons.
Total visible supply August 31, 1905	12,572
Against visible supply July 31, 1905	12,270
Against August 31, 1904	12,480
Against December 31, 1904	14,768
Stocks, including on dock and arrivals	1,721
Afloat	2,795

To-day's prices are firm, with 32.70c. quoted for prompt shipments from store, New York. The London market led this advance with a rise of £1 2s. 6d., to £148 12s. 6d. for spot and £147 17s. 6d. for futures. The arrivals so far this month amount to 440 tons and there are afloat for American ports 3600 tons. The small arrivals so far this month are further noticeable by the fact that there is no large amount scheduled to arrive before the Minnetonka, which carries 650 tons from Liverpool, scheduled to arrive September 11.

Copper.—The tide has turned and prices are lower than a week ago. At the present transitory state of the market it is difficult to obtain an exact quotation, but the indications are that 16.25c. is the present price for New York delivery. The situation is so unsettled that brokers themselves seem at a loss to diagnose the price question. The London market has declined and spot stocks are now quoted at £69 5s., while futures are steady at £69. Best Selected Copper, however, remains practically unchanged at £77. The exports of domestic Copper from Atlantic ports, according to reports compiled by C. Mayer, secretary of the New York Metal Exchange, show that 21,396 tons of Copper were exported during the month of August. The total exports since January 1, 1905, exclusive of Southern and Pacific ports, amount to 169,699 tons, as against 158,440 tons during the corresponding period last year. The present decline had its start when the news of peace negotiations was made known in London. This start was augmented by rumors of resales by Chinese melters, and there is no doubt that these consumers, who made such large contracts early in the year, have canceled a portion of them. This does not imply, by any means, that the entire Copper that has been shipped to China will reappear in the market. The Chinese, it may be presumed, will take any advantage their present peculiar position may afford them. It is probable that they will continue to sell in small lots and perhaps buy again when the occasion is more favorable. The exports so far this month amount to 1651 tons.

Pig Lead.—The Lead market is firm and dull, with quotations unchanged at 4.85c. to 4.90c., New York delivery. In St. Louis the market is a trifle firmer, ruling at 4.77½c. to 4.80c. The American Smelting & Refining Company continues to quote 4.85c. for shipment Lead in 50-ton lots. In London the market has declined slightly and Soft Spanish Lead is quoted on that Exchange at £24 5s.

Spelter.—A slight advance was made in the price of this metal to 5.75c. to 5.85c. for spot, August and September delivery. This is likewise true of the St. Louis market, which is also slightly higher at 5.65c. The apparent feeling is that the Western holders are desirous of higher prices, while New York brokers are endeavoring to secure lower prices, and there is considerable manipulation going on. Reports from various sources indicate that stocks on hand are low for this season of the year. The Ore market is weaker and prices are generally \$3 a ton lower than last week. There is some talk in the Ore market regarding an alliance among the smelters to force the price of Ore still lower.

Antimony.—Business is dull, consumers evidently waiting for a further reduction in price before covering their

wants. We quote for immediate delivery Cookson's and Hallett's at 14c. to 14.50c.; other brands, 12.50c. to 13.50c.

Quicksilver.—Business is fair at \$40 per flask of 75 lbs. in 100-flask lots. In London Rothschild's quotation is £7 2s. 6.

Nickel.—Quotations are 40c. to 45c. for good size lots.

Tin Plate.—Prices remain unchanged on a basis of \$3.74 per box of 100-lb. I. C. Coke Plates, f.o.b. New York, and \$3.55, f.o.b. Pittsburgh. Business is dull, but indications are not wanting that there will be an increase in activity in Terne Plates during the near future. In Swansea, Welsh Plates are unchanged at 11s. 10½d.

High Speed Steel in the Machine Shop.

Summing up the situation as to high speed steels in an article introductory to detailed data obtained in one of the largest American machine shops, O. M. Becker and Walter Brown say in the *Engineering Magazine*:

Given an equipment reasonably well adapted to the work required and doing it satisfactorily under conditions previously prevailing: What can be done with it in using high speed steel tools? High speed tools undoubtedly make possible in most cases a distinct reduction in the cost of production, but in order to secure the full advantage—that is, to work them to the limit of efficiency—heavier machinery is required, designed to meet the new conditions. Is it necessary to incur this great expense, or can the present equipment be adapted to permit a profitable substitution of the new tools? Undoubtedly the second course is preferable, except in possible specific instances. The savings will not be so great, in general; but usually it will be the more economical course to use existing installations, adapted so far as possible, until worn out.

Second, shall carbon tools be at once and entirely replaced by those made of alloy steel? By no means. In many cases doubtless it will be necessary to continue the use of carbon steel tools, for reasons that will appear in the specific cases. Furthermore, time will be required to find just where the new tools will be of advantage, and to determine just the conditions under which the tool must work in order to get the best results. The change will therefore be a gradual process, each case being considered upon its own merits.

Third, there are certain classes of jobs that can advantageously be taken up first. The most obvious are those where the present working speed seems unprofitably slow, especially large pieces requiring considerable machinery; where the material is so refractory as to wear out the tool quickly, and where an increased speed will permit reduction in the number of machines needed for the work.

And finally, there is the question of getting the new tools started in the factory and the operatives educated to their efficient use. For this an expert ought to be called into service. The novice may be able to make some showing; but in making a change economy is the thing under consideration, and it is poor economy to buy such experience at so high a price.

British consular reports refer to the decrease in importation of foreign shipbuilding materials into Germany. There is no duty on such imports, and up to the year 1900 the volume of this trade was considerable, Great Britain leading the list of countries furnishing this material. From 1,072,612 cwt., valued at £735,500, in 1900, the imports of shipbuilding materials into Germany fell to 555,770 cwt., valued at £244,000, in 1904. Foreign competition is somewhat handicapped by additional charges for freight, while domestic shipbuilding materials are sent at reduced freight rates over German railroads from the interior to German seaports.

Ernest L. Cronmeyer, superintendent of the National works of the American Sheet & Tin Plate Company, Monessen, Pa., has resigned to become general manager of the Humbert works, at South Connellsville, Pa. U. S. Smiley has been appointed to succeed Mr. Cronmeyer.

Iron and Industrial Stocks.

NEW YORK, September 6, 1905.

The stock market is now being affected by the possibility of higher rates for money during the crop moving period and all values have receded from the high point of last Thursday. The fluctuations meantime are indicated by the following range of prices on the most active stocks: United States Steel common 35½ to 37½, preferred 102¼ to 105½; Tennessee Coal, 85 to 90½; Sloss-Sheffield common, 89 to 91½; Pressed Steel common, 43 to 45; Colorado Fuel, 42 to 45¼; Locomotive common, 49¼ to 52½; Car & Foundry common, 35 to 38; Can preferred, 70 to 72¼. Reports of good business have occasionally caused some little advances, but this morning all prices were again under pressure. Last transactions on active stocks up to 1.30 p.m. to-day are as follows: Can common 11, preferred 69½; Car & Foundry common 36, preferred 101; Locomotive common 49, preferred 112¼; Steel Foundries preferred, 39¼; Colorado Fuel, 42; Pressed Steel common 44¼, preferred 95½; Railway Spring common 36, preferred 100¼; Republic common 20½, preferred 88½; Sloss-Sheffield common 90, preferred 107; Tennessee Coal, 85; United States Steel common 35½, preferred 102¾.

Dividends.—Cambria Steel Company, Johnstown, Pa., has declared a dividend of 2 per cent., payable October 2.

American Can Company has declared a quarterly dividend of 1¼ per cent. on the preferred stock, payable October 2.

In violation of their arbitration agreement 2700 members of the Amalgamated Sheet Metal Workers went on a strike in New York last week, demanding an increase from \$4 to \$4.50 a day and the employment of fewer apprentices and helpers. The Executive Committee of the Joint Arbitration Board of the Building Trades Employers' Association and the Unions declared the strike to be a violation of the arbitration agreement and ordered the men to return to work. At a meeting held Tuesday evening, September 5, the strikers refused to obey this order. The strike will now be considered by the Board of Governors of the Employers' Association. The usual course in such cases is to declare the union locked out and fill the places of the strikers with new men formed into a union under the arbitration agreement. The strike interrupts the work of nearly 300 firms and delays the construction of many important buildings. The work tied up includes that on steamer funnels, locomotives, elevators, boilers, smokestacks and other forms of sheet metal construction except such as is done by independent firms.

The importance of keeping up steam in factory boilers for purposes of fire protection was demonstrated by tests made in four New England mills. It was found that a well banked factory boiler may be relied upon to promptly operate a fire pump at the rate of 1000 gallons per minute, and that banking such a boiler so as to maintain a steam pressure of 50 pounds per square inch requires about 800 pounds of coal per day. In one of the tests four fire streams were had in 13 minutes when the boilers had been banked for a week; while tests upon cold boilers showed that the amount of time required to get up a steam pressure of 50 pounds was, on the average, an hour and a half.

A large lift lock, with a lift of 48½ feet, is to be constructed at Kirkfield, on the Trent Canal, in Canada. The chambers will be 140 feet long, 33 feet wide, and will have 8 feet of water over the gate sills. The main cylinders will be of cast steel, with rams 90 inches in diameter and 57 feet long. The total weight on each ram will be about 1700 tons, and the working pressure in the cylinders will be about 600 pounds per square inch. The towers, about 100 feet high, will be of structural steel, and the upper approach will be a steel aqueduct with a length of 35 feet. This use of steel throughout instead of concrete will give the lock a considerably different appearance from the similar lock on this same canal at Trent.

The Thomas Iron Company will hold its annual meeting at Hokendauqua, Pa., on September 12.

Charles R. Flint on Russian Trade Prospects.

Charles R. Flint of New York, who has spent two months in Russia, where he had several interviews with the Czar, returned home this week and in an interview in the *Daily Commercial* is reported to have expressed his conviction that American enterprise is destined to develop the great latent industries of Russia. He is thus quoted:

"I feel confident, now peace is assured, that Russia is about to enter upon a period of great industrial activity and I am satisfied that her policy is to encourage Americans to take part in the development of her enormous natural resources, comparable with those of the United States. Russia will undoubtedly reduce the duties on American products, which will probably be the first step in that direction.

"Russia recognizes that her industrial and agricultural conditions are practically the same as ours were 25 to 50 years ago, while differing from those of France, Germany, England and the other densely populated countries of Europe; that there are as good reasons to adopt American methods in industry and agriculture as there were for her to adopt our system of railway construction and equipment, and that there is no way in which she can give such an impetus to industry in Russia as by interesting Americans to inaugurate there the methods which have developed here under similar conditions the greatest prosperity ever known."

It has been generally reported that Mr. Flint had placed several contracts in Russia to furnish that country with war ships, but on this subject he would say nothing, except that he had carried on some important business with the Government, announcement of which would be made later.

Fatalities in Railroad Travel.—Commenting on this subject, the *Railway Age* says: "Over 10,000 people killed by railroads in one year." This is the large type heading with variations under which the newspapers have emphasized the accident summary of the Interstate Commerce Commission for 1904, leaving the possible inference that these figures indicate the fatality of railroad travel. But prominence is not given to the fact that of the 10,046 persons killed "on the railroads" 5105 were trespassers who invited their own deaths by stealing rides, walking on tracks and other acts for which the railroad companies were not responsible; that of the remainder the great majority met death otherwise than from accidents connected with the running of trains, and that the number of passengers killed as the result of collisions and derailments was 262, and not over 10,000, as the average reader may have assumed from the headlines. The Commission's declaration that only one passenger out of every 1,622,267 carried was killed, either by train accidents or by any other mischances, such as falling from cars, might fairly be emphasized also, by way of reassurance. In other words, 441 passengers met death from various causes, including a few extraordinarily fatal disasters, out of 715,419,682 passengers carried a total distance of 21,923,213,536 miles. Comparison might well be made with the number of fatalities not connected with railroads.

Leaving out torpedo boats, special service steamers, converted cruisers and a number of vessels whose fate is uncertain, a correspondent of the London *Times* figures that out of a total of 83 ships, with a displacement of 410,224 tons, sent by Russia into the belligerent arena only 10, with a displacement of 63,636 tons, remain in her fighting line. The Japanese force of 76 vessels, with a displacement of 274,184 tons, has sunk or captured 64 ships, with a displacement of 289,778 tons. On the other hand, while the Japanese have lost 12 ships, with a total displacement of 46,025 tons, they have captured or raised more than double this amount of tonnage.

At a convention in Hamburg of the Coal Dealers' Association of Germany a number of delegates spoke on the practice of tipping and bribing. They complained that stokers and others having to do with coal used in

manufacturing works and large establishments of any kind must be given bribe money or have their influence used against the coal dealers to prevent the securing of new orders. The delegates urged the necessity of taking measures to abolish the practice. The tipping evil is believed to have led to the bribery method which now has become so vexatious to business men.

British and American Tin Plates in Canada.

In commenting on the tin plate situation the London *Iron and Coal Trades Review* says: The British tin plate trade, apart from the loss of so much of the American demand as has been effected by a prohibitory tariff, remains practically as invulnerable as ever it was. The total tin plate exports of Great Britain are still close on 400,000 tons a year. The total export of all the other countries of the world, the United States included, is less than 20,000 tons. One phase of the tin plate trade that is difficult to be understood is that of the imports into Canada. The Canadian market for British tin plates has not much improved of late years, although in view of the enormous extent of the tinned salmon trade and other branches of food and fruit supply we should expect it to increase materially. The total British exports of tin plate to Canada in 1904 were more than 6000 tons under the exports of the previous year. This does not entirely correspond with the increased exports of tin plates by the United States in the same year, but there was a material advance of such exports in that year, and it is an easy thing to correlate the two facts. Indeed the American trade returns show that Canada did take a considerably larger quantity of American tin plates in 1904 than in the previous year. This would be a simple problem enough if the prices quoted in the two cases were approximately the same, but the official records of values show that the American prices, in 1904 at all events, were materially higher than the British. We are therefore driven to the conclusion that the American plates were taken because of the convenience of the source of supply and by means of the peculiar contracts made by American firms.

The Work by Diamond Drills in Ore Prospecting.

The statement has been going the rounds that the Oliver Iron Mining company had drilled more than 250,000 feet of diamond drill holes in the Lake Superior region, and it was estimated that these had cost the sum of at least \$1,300,000. The estimate is a very low one, and a few moments' figuring would prove it altogether below bounds. On the Mesaba range alone there are some 20,000 drill holes, averaging probably 350 feet, and of these a considerable share have been drilled by the diamond bit. There is 7,000,000 feet of holes, of which the Oliver Company and its predecessors have drilled their share. On a small area at Tower, on the Vermilion range, there are 400 holes, all by the diamond, and probably more than that number in the immediate vicinity, all drilled by the Oliver Company's predecessor there. On three forties of section 30-63-11 there are 15,000 feet of diamond holes, and there are similar spots scattered along the Vermilion from end to end. There are thousands of holes on the Menominee and Marquette ranges. The Cleveland Cliffs Iron Company had six drills going for months, day and night, where its Maas mine was afterward located. The Clergue syndicate drilled a hole 2400 feet deep in the Republic fold, looking for the formation. This was probably the deepest hole ever sunk in the Lake region. Recently there has been a remarkable revival in diamond drilling, not only on Lake Superior but all over the West. In the Missouri and Wisconsin zinc and lead districts there are more diamond drills than ever before. There are more of them on the older Lake ranges, especially around Negaunee and Iron Mountain, and at scattered points through Wisconsin and Minnesota drills are to be found. The cost of high grade carbons, such as are demanded for work in this region of hard and difficult rocks, is now about \$62 a carat, and they are gradually growing scarcer.

New Publications.

The Colliery Managers' Handbook. By Caleb Pamely. Published by D. Von Nostrand Company, New York, and Crosby, Lockwood & Son, London. Price, \$10.

The ponderous volume before us—it has 1178 pages—is really an exhaustive treatise of coal mining, more particularly from a British point of view, and with the desire to aid also the students who are preparing for an English first-class certificate. There is, of course, much that is elementary and much that applies specifically, and sometimes almost exclusively, to English conditions. Many of these sections the American reader will study with profit, while others he may dodge without compunction and yet find a very large amount of information which will help him in his work. In the interest of a handier volume the author might well refer his readers to some book on mechanical engineering instead of giving over 60 pages, for instance, to the steam boiler. More detailed description of the actual working of coal seams might have been substituted for it. There is practically no reference whatever to the work which has been and is being done in this country. It does not seem to us wise to ignore American practice altogether in a book printed in the English language. We fancy that the author, who seems to be familiar with German methods, has never been in this country and has not cared to inform himself concerning what is going on, although the United States produces more coal than Great Britain.

Cements, Limes and Plasters. By Edwin C. Eckel. Published by John Wiley & Sons, New York. Price, \$6, cloth.

Edwin C. Eckel, who has been connected with the United States Geological Survey, has undertaken the praiseworthy task of presenting a summary of the literature on cement materials from an American point of view. In the work before us he deals with the composition and the character of the raw materials, the methods of manufacture and the properties of plasters, limes, lime-sand bricks, magnesia, natural cements, Portland cements, slag cements and puzzolan cements. Mr. Eckel has done his work in a thoroughly conscientious manner and has produced a volume which will permit the working engineer to disregard what has thus far been printed in technical literature, unless he desires to make a profound study of some special point.

Annual for the Metallurgy of Iron (Jahrbuch fuer das Eisenhuettenwesen). III volume. Published by A. Bagel, Düsseldorf. Price, 10 marks.

Some years since the management of the Society of German Iron Manufacturers released the publication of an annual to supplement the well-known magazine *Stahl und Eisen*. The object was to present a synopsis of the literature of the metallurgy of iron and steel in systematic form. In the majority of cases the title and source merely are given, but the more important articles published in 134 journals are summarized as to their contents. The third volume, recently issued, is rather belated, owing to the illness of the author, Otto Vogel, but the next is promised at an early date. The work is admirably done.

A Manual of Mining. By M. C. Ihlseng and Eugene B. Wilson. Published by John Wiley & Sons, New York. Price, \$5. Cloth.

Dr. Ihlseng, who was for many years professor of mining at the Colorado School of Mines, presents a fourth edition of his course of lectures revised to include the wide field of coal mining and more recent developments in practice. He has secured the collaboration of E. B. Wilson, and, so far as the application of electricity to mining is concerned, that of Rolin W. Hutchinson. While we are inclined to protest mildly against the division into two parts, that of mining engineering and of practical mining, we may state that the treatment of the wide range of subjects is well balanced. It looks at times as though some of the old matter had not been eliminated with sufficient vigor, and this applies, too, to some of the illustrations, which have that air of the old text book friends who live eternal lives in the writings of

our professors. We observe a somewhat deplorable tendency, also, to presenting pictures of machinery and appliances which we believe ought to be supplemented as much as possible by mechanical drawings, so that the student is forced to learn to read such drawings. A picture of a water pressure engine or of a solenoid drill is inadequate and it does not seem right to dismiss the Riedler pump with a terse paragraph. The summary relating to "ores" in the chapter on Prospecting needs a good deal of revision. It is not true that "magnetic and specular oxide and the carbonate constitute the future supply" of iron, nor "with very few exceptions galena is exclusively the ore of lead."

Properties of Steel Sections. By John C. Sample. Published by the McGraw Publishing Company, New York.

With the object of aiding designers of steel structures Mr. Sample has presented in book form a series of tables some of which were prepared for his own use as a designer for a structural steel plant. Mr. Sample has compiled 27 tables of moments of inertia and radii of gyration, of columns and struts, gives interesting tables of properties of columns and sections, of top chords selected from some of the largest buildings and bridges in the United States, presents tables of safe loads for columns and has data relating to plate girders. The book is very clearly printed, an important point in a work of this character.

The Ninth Meeting of the German Mining Engineers (Bericht ueber den 9 ten allgemeinen Deutschen Bergmannstag). Published by Julius Springer, Berlin. Price, 4 marks.

The German mining engineers, a very influential body, have a meeting once a year and publish their proceedings in a neat volume which contains some excellent memoirs. In 1904 the meeting was held at St. Johann-Saarbruecken, in the Saar coal field, the greater part of which is owned by the Prussian Government. Among the papers printed in the last volume, recently issued, is one by Vogel on the manufacture of power and illuminating gas from low grade fuels, with special reference to the Jahns "ring producer"; by Gerkrath on the present status of the gas engine, by Professor Rupp on the Parsons turbine, by von Koenigsloew on the coal cutting machinery in the Saar district and by Schmitt on central condensing plants.

The Pennsylvania Steel Tie Company.—This new undertaking has applied for a charter and will have its offices and plant in Pittsburgh. The incorporators are W. W. Mechling, Jacob E. Smith and Frederick Howden, all of Homestead, Pa. Mr. Mechling has been connected with the Carnegie Steel Company for ten years as a department superintendent at the Homestead Steel Works and has invented a steel tie for which patents have been granted. The incorporators propose to build a plant in the Pittsburgh district for the manufacture of these ties. It is stated that a number of railroads have experimented with sample ties in the past year and that they have given entire satisfaction.

For the electrical operation of gold dredging boats on Alaskan rivers an entirely new plan has been evolved. The power house, which will be located at Dawson City, will be equipped with a 400-kw. generator, operated by a 600 horse-power steam turbine. Lines for transmitting this power will be strung from the station to wherever the dredges may be operating on the Yukon and its tributaries. On the boats will be installed induction motors of an aggregate of about 500 horse-power, in sizes ranging from 7 to 100 horse-power each.

The party of officials of the German Government delegated by Emperor William to investigate agricultural, commercial and industrial methods in the United States last week inspected the extensive plants of the Lackawanna Steel Company and of the Buffalo & Susquehanna Iron Company, Buffalo, and visited Niagara Falls, looking over the electric power plants and various manufacturing industries there.

British Pig Irons for Foundry Use.*

BY P. MUNNOCH.

Owing to the variations occurring constantly in all pig irons the same brand or mixture of brands is found in actual practice to give very different results at one time compared with another. As the pig irons produced in different districts vary in composition, and therefore in character, the founder, by mixing irons from different districts, is enabled to produce compositions suitable to the varying requirements of different castings. There is no sharp line of demarcation between the grades of iron produced at the blast furnace, one grade gradually merging into another; therefore it will be seen that the iron delivered will depend to a certain extent upon the ideas of the sampler, and no doubt the amount and grade of the iron made at the furnace as compared with the orders on hand to some extent influence his judgment.

Table I gives typical analyses of pig irons from different districts. These are chiefly from the author's own analyses, one or two having been added to make the list complete. No. 3 iron is taken in each case for sake of comparison:

Table I.—Typical Analyses of Pig Irons.

Grade.	Com- car- bon.	Gra- phitic car- bon.	Man- ganese.	Sili- con.	Sul- phur.	Phos- phorus.
Cumberland hematite No. 3	0.17	3.51	0.14	2.49	0.040	0.035
East Coast hematite No. 3	0.47	3.32	0.87	2.33	0.057	0.050
Cleveland No. 3	0.17	3.00	0.50	2.75	0.050	1.54
West Yorkshire No. 3	0.35	3.10	0.95	3.00	0.063	0.97
Lincolnshire No. 3	0.75	2.76	1.80	2.14	0.036	1.27
Derbyshire No. 3	0.35	2.97	0.80	2.47	0.035	1.40
Northamptonshire No. 3	0.08	3.04	0.29	2.75	0.020	1.69
Nottinghamshire No. 3	0.15	3.20	0.40	2.70	0.040	1.10
Lancashire No. 3	0.18	3.25	0.71	3.03	0.051	0.67
North Staffordshire No. 3	0.47	2.90	2.05	2.50	0.035	1.25
Ayrshire No. 3	0.47	3.01	0.89	2.33	0.027	0.56
Ayrshire No. 3	0.43	2.57	1.40	2.63	0.033	1.15
Lanarkshire No. 3	0.19	3.10	1.50	3.15	0.014	0.81
Stirlingshire { Cold } { No. 3 } { Blast }	0.68	2.72	1.08	1.56	0.101	0.61
So. Staffordshire { Cold } { Blast }	0.55	2.50	0.55	1.05	0.101	0.48
North Yorkshire { Cold } { Blast }	0.63	2.52	0.48	0.98	0.046	0.10

In ordinary foundry pig irons the variations in the amounts of total carbon, phosphorus, manganese and sulphur are generally small compared with the variations of silicon. This element varies to a very great extent from time to time, and a variation of 2 per cent or even more may be met with in the same delivery of iron. This is an extreme case, but a greater variation than this is possible and may occur in any one grade of the same brand.

As a rule irons made in the same districts from similar ores are similar in composition. The different brands, however, differ slightly. One may usually be high in silicon and low in total carbon, and another usually low in silicon and high in total carbon. In others there may be a difference in the amount of phosphorus, manganese or sulphur. An alteration of some of the details in the method of manufacture will often produce a difference in the general composition of the iron made.

Where irons are made from mixtures of ores there is usually more variation in the manganese and phosphorus than is the case where irons are made from one class of ore.

Table II.—Variations in Analyses of Pig Irons.

Cleveland Iron.—Ideal Analyses.						
Grade.	Com- car- bon.	Gra- phitic car- bon.	Man- ganese.	Sili- con.	Sul- phur.	Phos- phorus.
No. 1	0.10	3.30	0.65	3.50	0.02	1.60
No. 2	0.15	3.20	0.65	3.30	0.03	1.57
No. 3	0.30	3.00	0.60	2.75	0.05	1.57
No. 4 foundry	0.40	2.85	0.55	2.25	0.08	1.55
No. 4 forge	0.70	2.50	0.50	1.75	0.13	1.57
Mottled	1.30	1.77	0.30	1.10	0.25	1.58
White	3.05	nil.	0.20	0.75	0.45	1.60
Cleveland Irons.—Actual Analyses.						
No. 1	0.15	3.15	0.60	2.50	0.033	1.59
No. 3	nil.	3.10	0.55	3.65	0.040	1.39

* Abstract of a paper read before the Cleveland (Eng.) Institute of Engineers.

No. 3	0.80	2.60	0.57	1.40	0.054	1.54
No. 4 foundry	trace.	2.95	0.61	3.53	0.033	1.51
No. 4 foundry*	0.56	2.69	0.40	2.10	0.081	1.60
No. 4 foundry*	0.97	2.47	0.39	1.21	0.075	1.58
No. 4 foundry†	from			2.24		
No. 4 foundry†	to			3.96		
No. 4 forge	0.50	2.65	0.40	2.45	0.095	1.61
No. 4 forge	1.12	2.17	0.27	0.93	0.141	1.56
Mottled	1.46	1.76	0.32	1.75	0.280	1.59
Mottled	0.90	2.30	0.31	0.93	0.237	1.63

Hematite Irons.

No. 1	1.35	5.25				
No. 1	0.93	2.39	0.027	0.06		
No. 1	0.96	3.77	0.72	1.04	0.027	0.06
No. 2				1.75	0.038	0.06
No. 2	0.92	3.14	1.38	1.23	0.043	0.06
No. 3	0.55	3.15	0.75	1.40	0.080	0.06
No. 3	0.45	3.33	0.90	3.10	0.030	0.06
No. 4 forge	0.40	3.02	1.12	2.91	0.095	0.042
No. 4 forge	0.73	3.13	0.48	0.60	0.116	0.065

* Same delivery. † Same delivery.

As a general rule in any one brand of iron as silicon increases sulphur decreases, and as silicon goes down sulphur goes up. This rule, however, cannot be applied haphazard to any collection of pig iron samples, as a high silicon is frequently associated with a high sulphur, and a low silicon with a low sulphur.

Table II contains an example of ideal analyses and grading of Cleveland (England) iron; also several examples of extreme variations actually found in the irons used at works of Richardsons, Westgarth & Co., Limited, Middlesbrough.

Effect of the Various Elements.

No. 1 iron is usually higher in total carbon and manganese than the lower grades and also lower in sulphur. Silicon is generally but not always high. As the grade goes down sulphur and combined carbon increase, while silicon and manganese generally decrease. Irons rich in total carbon have a much darker and more open grain than irons otherwise similar in analysis which contain a lower total carbon. This is due to the higher content of graphite. Irons with a low total carbon usually have close grain and a light colored fracture.

Sulphur to a large extent controls the grade as determined by fracture and also controls the combined carbon. Combined carbon usually increases with increase of sulphur. Irons low in sulphur usually have a large open grain; as it increases the grain becomes closer. With a high total carbon sulphur may be increased slightly above the normal without affecting the grain; in this case there is usually an increase in combined carbon. Silicon in ordinary normal foundry irons appears to have only a slight effect on fracture and grade. When silicon increases it usually displaces total carbon, thereby lowering the combined carbon. Iron with above 4 per cent. of silicon usually shows a silvery appearance and is called glazed iron. With a low silicon a relatively higher total carbon is necessary to give an iron of similar appearance to one which contains a higher or normal silicon.

Iron low in silicon is very sensitive to the action of chilling, and this is greatly influenced by both sulphur and manganese. Manganese in ordinary foundry iron does not appear to have much effect upon appearance of fracture when below about 3 per cent., although the presence of much manganese renders the iron hard to drill or machine. Practically the effect of manganese is to increase the combined carbon without affecting the grade as determined by fracture. Combined carbon does not appear to have a great effect on the appearance of pig iron except when the iron begins to show a forge or mottled fracture.

Phosphorus has practically no effect upon the grade of pig iron as determined by appearance of fracture. As phosphorus increases total carbon decreases, and the normal amount of total carbon varies from about 3.75 per cent. in normal hematites down to about 3.30 in normal Cleveland irons containing 1.5 per cent. of phosphorus—that is to say, with an increase of 1.5 per cent. of phosphorus there is a decrease of 0.45 per cent. of total carbon. Phosphorus has no effect upon combined carbon, but as phosphorus increases the iron shows a lighter color, due to the phosphide of iron present.

The appearance and grade of pig iron are affected to

a great extent by the varying conditions of casting and cooling. This makes it a difficult matter to determine the effect of composition on fracture with any degree of certainty.

Mixing by Analysis.

As the physical or mechanical properties of cast iron depend on its chemical composition, together with the effects of the conditions of melting, casting and cooling, it may be taken as a general rule that metal of similar analysis, melted, cast and cooled under similar conditions, will produce castings having similar physical or mechanical properties. This leads to the foundation of mixing by analysis, that if the resulting metal is of the same analysis and the other conditions are the same, the castings produced will have the same properties, independent altogether of the brand or brands of iron used. The chemist, therefore, given irons of suitable composition, is able to produce an iron having the composition and character of any particular brand of iron.

This in turn brings forward the fact that the properties of such special irons as cold blast depend upon the composition; cold blast is only the means of producing this composition, and if an iron having the same composition could be produced by means of hot blast the iron would have the same properties. Furnaces working with hot blast usually produce an iron having a higher total carbon when making iron which is otherwise similar in analysis. It is possible to reduce the total carbon by the addition of steel and thus duplicate cold blast irons.

Selecting and mixing irons by analysis renders the founder independent of any particular brand of iron, and enables him to substitute low priced for high priced ones. The low priced irons may in some cases be more suitable than the higher priced irons. In some districts, and with some classes of work, the saving to be effected is very small, and the chief benefit obtained is from the greater regularity of the composition and mechanical properties of the castings produced.

The founder who is so placed that he has irons from different districts at his disposal is enabled to change his irons as the markets change, and at the same time produce castings of suitable composition and mechanical properties.

The ideal method of working is to buy irons by analysis. At the present time this is a difficult matter, as few makers of pig iron are willing to sell by analysis. Those who are willing to do so require a higher price for selecting the iron. At the present time, therefore, irons must be bought by grade, and as they vary from time to time a certain amount of stock must be kept for mixing. This is not so much a question of large stocks as a judicious selection of irons which can be used to correct any irregularities which may occur from time to time in those bought, and which may also be used for producing mixings for castings requiring special or unusual composition.

Composition of Castings.

It is by no means necessary in any particular district to turn out castings of the same analysis as castings produced in another district where the irons within reach of the founder may be different in composition. In those districts where high phosphorus irons are cheapest, phosphorus will be found to be higher in the general output of castings than is the case where irons of a lower content of phosphorus are cheaper. The same also applies to manganese. Castings for machinery and general engineering work vary greatly in composition in different districts, but as a general rule the phosphorus averages about 1 per cent. This may be due to the fact that the general average of all the pig irons produced in this country is about 1 per cent. phosphorus.

Manganese usually varies from 0.3 to 1.5 per cent., but the average is about 0.7 per cent. Silicon may vary from 1.0 to 3 per cent. The average is about 1.8 per cent. Total carbon usually 3.2 to 3.5 per cent. Combined carbon varies to a very great extent. In some cases the total carbon is entirely in the form of graphite, in others the greater part may be combined. Combined carbon may vary to a great extent even in the same casting. Sulphur usually varies between 0.03 per cent. and 0.15 per cent.

In special engineering castings where great strength is required total carbon, manganese, silicon and phosphorus are usually all low. For castings requiring to be extremely soft and tough hematite iron alone is used. Iron for special castings is in some cases remelted once or twice before casting. This is only necessary when a higher grade of iron than is required is being used. Where reasonable care is taken in the weighing of all materials charged into the furnace the results will be quite as regular without this remelting.

The effect of remelting in the cupola is equivalent to lowering the grade. Usually silicon is decreased by 0.2 to 0.3 per cent. Sulphur usually increases to the extent of 0.02 to 0.04 per cent. About 25 per cent. of the manganese is lost. Total carbon increases or decreases according to the amount present, whether below or above the normal.

With regard to mixing by analysis for the foundry, this cannot be a success unless the necessary requirements are observed. These are, briefly, a reasonable amount of stock of the different brands and grades of iron necessary and a small stock of extremes for correcting variations; sufficient yard room for stocking purposes, preferably near the cupola to save unnecessary handling; suitable means for weighing all materials charged into the furnace. Unless these requirements are complied with it will be impossible to mix by analysis.

The July output of the German Steel Association in finished material was 414,187 metric tons; half finished, 146,124 tons. The July production was 27,602 tons less than in June and 65,000 more than in July, 1904. The administration of the State railroads has just placed large orders for rails, locomotives and cars. The Rhenish Westphalian Steel Association has under negotiation a new agreement with the Upper Silesian Association.

The magnitude of the heating proposition in a large railroad shop is well exemplified in the case of the new shops of the Southern Railway Company at Spencer, N. C. The machine shop alone contains 4,500,000 cubic feet and requires for its heating two special steel plate fans, 9½ feet in diameter, driven by 10 x 10 inch horizontal engines and installed in connection with a total of about 21,000 feet of 1-inch pipe massed in individual heaters. The entire equipment was furnished by the B. F. Sturtevant Company, Boston, Mass., and is designed to maintain a temperature of 60 degrees when the outdoor temperature is 10 degrees F. Distribution is made through a system of overhead piping, with discharge pipes leading down to within about 10 feet of the floor.

A revised list of the papers to be read at the Sheffield meeting of the Iron and Steel Institute, at Sheffield, England, September 26 to 29, contains the following additional titles to those published in *The Iron Age* of August 3: "The Wear of Steel Rails on Bridges," by Thomas Andrews, Wortley, England; "The Transformations of Nickel Steels," by L. Dumas, Paris. Among the names of new members proposed are the following Americans: John Penn Brock, Lebanon, Pa.; Prof. Edward D. Campbell, Ann Arbor, Mich.; John Gregson, Jr., Steelton, Pa.; Charles McRae Grey, New York City; Joseph E. Johnson, Jr., Longdale, Va.; Clement Grubb Smith, Steelton, Pa.

Careful measurements of the Atlantic waves have been made for the Hydrographic Bureau in Washington. It has been found that the ordinary big wave averages about 30 feet in height, while those due to severe storms attain a height of from 40 to 48 feet. The largest ones are often 500 to 600 feet in length, with a period of 10 or 11 seconds, while the longest recorded had a length of ½ mile and lasted for no less than 23 seconds. It has been noticed that in general the longer the wave the less is the proportion of height to length; in other words, the longest waves have the easiest slopes, and hence in some ways are less to be feared than the shorter, steeper waves of a sudden storm.

HARDWARE.

IN our last issue we presented a communication calling attention to a matter that perhaps has not received the full consideration to which it is entitled. We refer to the letter pointing out the injury done the retailers as a result of the course pursued by some of the jobbers. Our correspondent states that according to the best testimony only a small percentage of the total production of Hardware is marketed through the catalogue houses, and he argues that a more serious injury than is thus done to the regular Hardware retailer comes from the jobber who places his goods in the hands of outside storekeepers. He refers to the practice of selling goods in the Hardware line to druggists, saddlers, pawnbrokers, grocers, racket store keepers, book sellers and other parties outside the regular Hardware trade. These goods are not placed there by the catalogue houses, but are as a rule sold to such dealers by the jobbers. This is one of the practices prevailing in the trade which certainly interferes very seriously with the business of the local Hardware merchant. Some large jobbers are understood to have several sets of traveling salesmen. One set will visit the Hardware stores in a certain territory, while another will call upon the druggists and other merchants who sell Cutlery, and still another may call upon saddlers, racket stores, grocers, &c. The Hardware salesman can truly say that he does not sell to dealers outside of the Hardware line. Nevertheless, the jobber whom he represents is securing trade from a large number of dealers in the same town who are not strictly Hardware merchants. This is not a matter which has been passed by in silence. It has received considerable attention. In these latter days, however, with the discussion of the catalogue house question attracting so much attention in the trade, sales by Hardware jobbers to other than Hardware merchants have to a great extent been ignored. The jobbers are taking a very deep interest in the catalogue house question and are to be commended for the earnestness with which they are assisting the retail merchants in their warfare on the methods of the catalogue houses. It seems to be opportune for them to consider this question also as one which should receive adequate treatment. It is a good time to endeavor to eradicate all practices which interfere with the well being of the retail Hardware merchant. Our correspondent may have overstated the case in claiming that the practice of jobbers in selling to other than Hardware merchants causes very much more trouble to retail Hardware merchants than catalogue house competition. Still it must be conceded that much harm is thus done to the legitimate retail merchant. The practice is a trade evil which calls for correction.

To be successful a merchant must be imbued with such enthusiasm for his calling that he will not fail to believe the articles he is selling are entitled to good prices. His enthusiasm falls short of its full measure if it does not include appreciation of the merit of everything in his stock. A man may take pride in the appearance of his store, in the system which he introduces into his accounts, in the methods which he uses in securing the attention of the public and in the bargains he makes with those who sell goods to him, but he will fail in an essential requirement if he has not such faith in the value of the goods which he sells as to insist upon getting prices which will realize a fair profit, unless, of course, he has an object in making a leader of some one or more lines. We have known instances in which merchants thoroughly equipped to conduct their business, apparently

proficient in all the qualities needed to make them successful, have proved weak in selling their goods. This possibly has arisen from overestimating the strength of competition from other merchants or from a natural predisposition to pessimism. The man who looks persistently on the dark side feels that to maintain his footing in the trade he must offer inducements to those who purchase from him and fears to ask a price fair to himself. The merchant who is thus constituted almost invariably comes to grief. During his career in a community he makes himself a continual thorn in the side of others who are in the same branch of trade. They may all be anxious to keep up their prices and secure a fair return on their investment and proper compensation for their labors, but find themselves unable to do so by reason of his competition. In the case of such a man this competition may not mean that he is endeavoring to increase his trade at their expense, but simply that he has not sufficient confidence in the merit of the goods which he sells to aim to secure what they are really worth. It is unfortunate for himself as well as for the community that any merchant should lack that pride in his business which makes him feel that the wares he sells are too good to be sacrificed.

Condition of Trade.

September has opened with very satisfactory conditions and excellent prospects. There is a good volume of current business, as the trade are purchasing with confidence in view of the general strength of the market and the probability that good stocks will be required to take care of the demand, which is expected to increase with the advance of the season. There is, however, little evidence of speculative buying, although in some lines it is thought not unlikely that values will be higher, with a possibility that manufacturers will be so laden down with orders that they will not be in a position to make prompt shipments. In this state of things many of the jobbing trade have been placing orders a little earlier than usual and for somewhat larger quantities, and the result is that manufacturers in the lines most directly affected are well sold up. While the market is generally steady and in some directions strong there are a few lines in which a less confident tone, if not something of weakness, is found. Heavy goods are generally commanding slightly higher prices, but in some branches, such as Bolts and Nuts, while general conditions should give an advancing market, the competition which exists tends to keep quotations down to a lower level than would otherwise be maintained. The advance in Copper is having a decided influence on prices of goods into which this material enters largely and a very active business is doing. The market generally is thus in a condition which repays the best attention from those who are charged with the purchasing of goods and gives opportunity for the exercise of judgment and skill in buying. Fortunately there is not connected with it the depressing influence which comes from a weak or declining market. It is gratifying to note the encouragement which thus exists for enterprise and energy in the prosecution of business and the conditions which justify taking a hopeful view of the trade of the season on which we have so auspiciously entered.

Chicago.

The month of August, for both jobbing and retail trade, shows a comfortable increase over the same month a year ago. With some interests the gain is noteworthy. Prices as a general rule are unchanged, but with a firm tone. Copper Sheets and Copper Bottoms have been advanced 1 cent a pound, and the whole Brass and Copper list is strong, with probable advances in all commodities using these metals. There is nothing new in the prices of Wire products, and it has not yet been possible for producers to secure full official prices, though the continued firmness of Billets and Wire Rods will make it

impossible for mills not controlling their supplies of these raw materials much longer to continue to operate. The same is true of Sheets, Black and Galvanized, which are still selling below the cost of production for such mills as have to pay present prices for Sheet Bars. Roofing and Siding are being offered by some interests at practically the price of the sheets from which they are made. Prices on Stove Pipe and Elbows are well maintained and demand is good. Makers of Builders' Hardware are falling further and further behind in their deliveries, especially on special designs, though there is a good deal of delay in filling even stock orders. Nuts and Bolts continue to be lower in price than is warranted by costs of raw materials, and prices do not advance materially even in the face of a demand that is taxing mills to their utmost and depleting jobbing and mill stocks. A noteworthy feature of the general Hardware trade is the steadily improving demand for the better grades of goods. For this reason the profits of both jobbers and retailers show a greater percentage of increase than do the tonnage as compared with those of a year ago.

St. Louis.

NORVELL-SHAPLEIGH HARDWARE COMPANY.—Fall business is opening in very satisfactory volume. The condition of the corn crop continues to improve. From Texas we receive more encouraging reports in regard to the progress of cotton.

While they seem to have the yellow fever somewhat under control in New Orleans it is spreading in other parts of Louisiana. The city of New Orleans is now returning the compliment by quarantining against other points in the State. We are in receipt of letters from many merchants in Louisiana stating that the most serious inconvenience as a result of the yellow fever is the delay in their mails. For the time being they appreciate the rest they are enjoying from the importunities of traveling salesmen.

The writer has been impressed with the effect that vacations have had upon correspondence in the months of June and July. It is a very common thing for letters to be acknowledged with the statement that the matter will be given attention when Mr. Jones, the manager, returns from his vacation. In one of the prominent clubs here in our city at one time there was only one officer at home. He had to O. K. vouchers and sign checks, although this is against the rules. The banks and trust companies have had to manage carefully in order to have a quorum at their directors' meetings. The heads of departments of mercantile houses have been at their wits' ends to take care of current business in a satisfactory manner on account of the absence of employees enjoying vacations. Even the members of the Catalogue House Committee have run away to the mountains, to the lakes and to the seashore. I presume all this is simply an evidence of the general prevalence of prosperity or of a spirit that a vacation in hand is worth two in the bush.

Cleveland.

THE W. BINGHAM COMPANY.—As the railroad companies have not been buying much in the last year or two, they simply must buy now, as many roads are being double tracked or are laying out additional tracks. Crops promise to be heavy and freight traffic is going to be enormous. Increase in the capacity of the cars means larger locomotives, stronger bridges and heavier rails, and this means an immense consumption of rails and other materials.

Trade in general Hardware in this district is very large at the present time, as almost all the salesmen have returned from their vacations, and they find customers' stocks very much depleted and goods of all kinds needed. Nails, Wire, Hinges and House Trimmings of all kinds are in great demand.

The recent advance in the price of ingot copper has stimulated trade in all lines of goods in which this metal is used, and we are looking for much higher prices than those which at present prevail. We advise customers to supply their wants at once on Copper Wash Boilers, Tea Kettles and Tea Pots, Coffee Pots, Copper

Rivets, Tacks and Nails, also Bronze Metal House Trimmings and Brass Fittings of all kinds.

We think everything points to a very large and continuing trade this fall, and the prospect for a "corking" trade for 1906 is good. We say to merchants that they had better anticipate their wants and keep their stocks well assorted.

There is a steady demand also for Carpenters' Tools of all kinds, showing that the artisan is well employed. In fact, labor troubles in all sections seem to have quieted down and everybody appears to be busy. Our advice is: Let each one "saw wood" and attend to his own business and every one will have plenty to do and will be putting money in the bank.

Louisville.

BELKNAP HARDWARE & MFG. COMPANY.—The market continues active and the volume of business quite satisfactory, notwithstanding the fact that a large area which bestows a liberal business on this market is crippled and shut off by yellow fever restrictions. This dread disease is not so fatal this year as usual and people are getting over the panic which came with its first appearance. It is unfortunately spreading out to some of the smaller points, where it is not so scientifically dealt with as at New Orleans. But with the advent of the fall months and the consequent shortening up of the time until the appearance of frost the terror will undoubtedly diminish.

The development of the coal fields in this State, both east and west, goes on at a very satisfactory rate. A new railroad is projecting through to the eastern fields, where the veins are thickest. These, with the development of various other industries, cement, building stone, hard wood timber, &c., will give the State a substantial advance in the way of manufactures. Labor is extremely well employed at full compensation. In fact, if any trouble threatens it is that of the large number of idlers who can make enough in a day or two's work to run them the rest of the week. There has been quite a number arrested in our own city on the charge of "loitering." These cases, however, are apt to have more political significance than economical.

The building of the large Carnegie Library, which is to cost over a quarter of a million dollars, has been begun, as well as other considerable enterprises. The sale of Lincoln's birthplace in Larue County a few days ago developed more than passing interest. It was thought that it would not bring over \$2000 for the 110 acres, as they are not especially productive, but it realized almost double that. The sentiment for it added 100 per cent. to its recognized commercial value.

Baltimore.

CARLIN & FULTON.—For the last four or five weeks this city has been favored with an extraordinarily active business, especially from the South. All lines of trade have been well patronized by the visiting merchants throughout the country, who have been brought here by the activity and push of all the different houses, which ever since the fire of February, 1904, have spared no effort to not merely hold the trade of old Baltimore but to largely increase it even under the disadvantages under which business was done immediately after that great disaster. The new structures which were put up and which are still building have given improved facilities for conducting business, and the trade are recognizing the advantages which are now being offered in the large and varied stocks of goods, the economy in distribution resulting in most favorable prices as well as liberal terms.

Though the remarkable rainy season has been injurious in some sections to the growing crops, yet altogether the agricultural community cannot help being pleased with market prices of their commodities.

This is Labor Day and organized labor is having its holiday and its annual parade. It is a great gratification to be able to say that with all the immense amount of work done and being done in this city since the great fire heretofore alluded to strikes have been unknown, and though our merchants have all and more than they can at-

tend to yet there has been perfect harmony between both employer and employee.

From all that we can learn business will continue good for the balance of the year, and the prospects for a strong and firm market are most excellent.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Since our last letter there is not much to note in the way of change. Business keeps up in the usual volume and collections are as good as can be expected for the vacation period. Conditions would seem to indicate a very excellent fall trade. The crop outlook is very good and unless all signs fail we are expecting a fall season that will fully keep pace with its predecessors. Manufacturers (as far as reports can be credited) seem to be full of orders, and, in fact, we experience great difficulty in getting very many lines of goods, all of which indicates a condition which seems to bear out the prophecy of continued good trade.

A very great stimulus to the improvement of commercial conditions is the signing of the peace treaty at Portsmouth, the accomplishment of which is largely due to the untiring efforts of President Roosevelt, who so wonderfully filled the breach existing between Tokio and St. Petersburg when diplomacy apparently had failed, and whose unrelenting interest the world has to thank for the ending of a war which has already entailed the loss of thousands of lives and millions of treasure. This one fact alone brings America more prominently before the gaze of the nations and cannot but redound to our advantage from a commercial standpoint, removing as it has the only menace apparent to current prosperity in this country and abroad.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—We are very glad to state that since our last report general business conditions in the South have improved considerably. While the yellow fever is still in existence in some sections, and probably will be for several weeks, the authorities seem to have it under pretty thorough control. The people are becoming used to the situation and are not allowing the yellow fever to interfere so much with business as they did a few weeks ago.

Nearly all the traveling men are now on the road, and the orders are coming in pretty regularly and are for liberal quantities and well assorted. The Hardware jobbers of this city are having about as much business as they can take care of without working an extra force or overtime.

The fall trade is opening up well and there is a large movement of winter goods. Sales of Stoves, Cutlery, Guns, Toy Wagons and Saddlery Goods are very heavy. Many retail merchants from all over the South have already been to this market placing their fall and winter orders, and Nashville is steadily growing as a distributing point in all lines.

There seems to be a stiffening up in prices on Hardware generally, many lines showing advances. Collections are exceedingly good.

Omaha.

LEE-GLASS-ANDRESEN HARDWARE COMPANY.—Although the backbone of summer weather may not be broken, it would appear that the recent change in atmospheric conditions had produced a compound fracture. With a continuance of favorable weather the yield of the corn belt will be something phenomenal, and the existing values should bring a very large amount of money into circulation. An Easterner passing through the country on the train remarked, "Why don't they cut down this timber?" A native replied, "This is not timber; it is this year's corn crop."

Business is good in all directions. The outlook for the future is very promising. A very large quantity of both small and large grains will be marketed within the next few months, and it is expected that this important feature will create a season of business activity that will extend through the winter months. Building operations in the cities as well as in the country districts are very extensive. Mechanics and laborers are fully employed, as

the demand is greater than the supply. General conditions, therefore, could not well be improved upon.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—Trade in the Pacific Northwest is of fair volume considering the season. All sections are in the midst of harvest or hauling to market, so it is reasonable to expect some falling off in trade. While crops are not turning out so well as expected earlier in the season owing to an unusually dry summer and prices for products will not rule so high as last year, still everything seems to indicate a good fall business.

We are pleased to chronicle a visit from Mr. Supplee of Philadelphia, four times president of the National Hardware Association, the past week, and note with gratification the many pleasant things he had to say of his journey and impressions of our country, resources and future. We trust that in the near future the National Hardware Association will choose as its meeting place either San Francisco, Portland or Seattle, so that more of the trade will visit the Pacific Coast, as Messrs. Supplee, Kirk, Hibbard and Marshall have done, the latter to open a large branch house in Portland. The Pacific Coast is an empire in itself and few that control the financial interests and industries of the country are awake to its extent and possibilities.

St. Paul.

FARWELL, OZMUN, KIRK & Co.—Conditions of trade have been on the whole as favorable as expected for the last fortnight, and as the harvest is now well along it appears evident that a good fall business may be expected. The weather has not been quite so favorable for harvesting, stacking and threshing as we could desire, but still there has been considerable good weather and harvesting has made much progress. There is some territory in which the crops are not being harvested with entire satisfaction owing to the excessive rains, but we believe this territory to be limited, and there is still time for the crops on it to be secured.

Upon the whole the outlook is quite favorable and a fine fall trade is expected. The probability is that fair prices will be realized for nearly all products of the farm, and there is no reason now apparent for any doubt as to the conditions in the Northwest at the close of the year.

NOTES ON PRICES.

Wire Nails.—Car and steel shortage coupled with congested conditions at mills are possibilities following a large placing of orders during the month of August for Nails and Wire products, in connection with business expected during the fall. Excepting concessions in prices to a few points of delivery, the market generally is firm. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers.....	\$1.80
Carloads to retailers.....	1.85

New York.—Local demand continues excellent, that during August being up to if not ahead of any month during the present year. The market is firm on the basis of \$1.95 to \$2 for small lots from store.

Chicago.—August has been a heavy month with the leading producer not only in Nails but in all Wire products, and the tonnage booked up to date for fall delivery is so great that there is likely to be some difficulty in securing deliveries, particularly along grain and cotton carrying roads, where car shortage will be added to mill congestion. Official quotations are still higher than actual quotations, particularly in disputed territories, but the tendency is toward a firmer basis. The official schedule is on the basis of \$1.95 in car lots to jobbers, \$2 in car lots to retailers, with 5 cents advance for less than car lots from mill. Price from jobbers' store in small lots is unchanged at \$2 to \$2.05, base.

Pittsburgh.—Demand for Wire Nails is more active than for some time and the manufacturers anticipate a very heavy fall trade. Should there be a pronounced shortage in steel, which is not unlikely, there may be

trouble later on in getting prompt deliveries of Wire Nails, and the jobbing trade is anticipating this as far as possible by sending orders in early. The tone of the market is quite firm, concessions in prices being exceptional and made to only a few points of delivery. We quote Wire Nails at \$1.80 in carloads to jobbers, f.o.b. Pittsburgh, plus actual freight to point of delivery.

Cut Nails.—An improved demand has strengthened the market to some extent, the extremely low quotations not being so much in evidence. Present quotations are, however, near to the cost of production, and possibly will not remain in force if demand continues large. Quotations are as follows: \$1.00, base, for carload lots, f.o.b. maker's mill. Iron Cut Nails for delivery at Pittsburgh, Buffalo and all points west of these cities are held at about \$1.70, base, in carload lots.

New York.—The market is unchanged and demand is seasonable. Quotations for small lots from store are on the basis of \$1.90.

Chicago.—The quotations named below represent costs to nonfavored buyers, the favored buyers doing somewhat better. These prices are spoken of by manufacturers as being near to if not below cost of production, a condition that is not likely to last in the face of a continuation of the present excellent demand. The current market prices at Chicago are as follows: To jobbers, f.o.b. Chicago, in car lots, \$1.75, base; retailers, car lots, \$1.80, base; less than car lots from mill, \$1.90, base; small lot from store, \$2, base.

Pittsburgh.—Demand for Cut Nails is better than for some months, the jobbing trade placing orders quite liberally on account of the low prices ruling. The manufacturers believe that fall trade in Cut Nails will be quite large and are not disposed to make concessions in prices as freely as in the past. We quote Cut Nails at \$1.60, base, in carload lots, f.o.b. maker's mill. Iron Cut Nails are held at \$1.70 per keg in carload lots.

Barb Wire.—Indications point to a large fall demand, following liberal orders already placed with the mills. The prospect for firmer market conditions and a return to official quotations is more promising. Official quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.95	\$2.25
Retailers, carload lots.....	2.00	2.30
Retailers, less than carload lots.....	2.10	2.40

Chicago.—All indications point to a heavy demand for fall consumption. Jobbers have as a rule taken advantage of the liberal concessions from official prices to lay in heavy stocks. Official prices, which are still higher than actual quotations, are as follows, f.o.b. Chicago: Painted Wire, \$2.10; Galvanized, \$2.40; car lots to retailers, 5 cents higher; less than car lots, Painted Wire, \$2.25; Galvanized, \$2.55; Staples, Bright, in car lots to jobbers, \$2.05; Galvanized, \$2.35; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—Tonnage in Barb Wire is increasing and the tone of the market is firmer, concessions in prices being harder to obtain than for some time. The mills look for a large fall trade and believe that official prices will soon be strictly observed, which has not been the case for some time. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

	Painted.	Galv.
Jobbers, carload lots.....	\$1.95	\$2.25
Retailers, carload lots.....	2.00	2.30
Retailers, less than carload lots.....	2.10	2.40

Smooth Fence Wire.—Demand is showing an improvement, and so are market conditions. Concessions in prices are made less frequently than for some time and quotations are usually up to the official schedule. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.65
Retailers, carloads.....	1.70

The foregoing prices are for base numbers, 6 to 9. The

other numbers of Plain and Galvanized Wire take the usual advances, as follows:

	6 to 9	10	11	12	12½	13	14	15	16
Annealed.....Base	\$0.05	.10	.15	.25	.35	.45	.55		
Galvanized.....	\$0.30	.35	.40	.45	.55	.65	1.05	1.15	

Pittsburgh.—Orders are being placed more liberally than for some time, jobbers desiring to have as large stocks as possible in view of the expected heavy fall trade. Prices are firmer than for some time and concessions are now the exception in place of the rule as formerly. In fact, it is claimed very little Fence Wire is being sold below official prices. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

Jobbers, carloads.....	\$1.65
Retailers, carloads.....	1.70

Bolts and Nuts.—Active demand, which is testing the capacity of many manufacturers, continues to be the strengthening influence in the market for Bolts and Nuts. The strengthening prices of raw material also make for firmness in the face of conditions which otherwise are not the most satisfactory. Positive improvement, with a uniform advance in prices, is still hoped for and may actually be forced by the large consumption referred to, but there is a tendency to independent action on the part of some large producers which under less favorable trade conditions might lead to no little irregularity.

Scythes.—Manufacturers have advanced the price of Scythes 25 cents per dozen, the advance taking effect September 1.

Copper Products.—The impetus given to goods wholly or partially Copper by the advances recently in Ingot Copper is reflected in the present prices of the numerous classes of products quoted below, the prices named being contingent on fair sized orders, there being current both lower and higher quotations according to the magnitude of the business, while in some cases bonuses are paid for quick deliveries.

Sheet Copper, following the advance on August 17 of 1 cent (or from 19 to 20 cents per pound, base), has been further increased under date of August 30 to 21 cents.

Copper Bottoms, Pits and Flats constitute a group in harmony with the Sheet Copper list (with the natural increase in cost for additional labor in manufacture) and experienced the same advances of 1 cent per pound on the above mentioned dates—i. e., August 17 and 30—or in the aggregate from 23 to 25 cents per pound, base.

Copper Wire is now quoted to merchant trade at 25 per cent. discount, former quotations being 30 to 30 and 5 per cent. discount. To the large consumers whose purchases are in the hundreds of thousands of pounds the advance has been from 16¼ cents, base, to, as at present, 18½ cents, base, the increases occurring August 1, 4, 18, 22 and 25, following closely the market for Ingot Copper.

Copper Rivets and Burrs are now 50 and 10 and 5 per cent. discount to average buyers, with a concession to large purchasers.

Soldering Coppers were originally advanced August 19 ½ cent per pound, to 19½ cents, and again on August 29 1 cent, to 20½ cents, per pound, base, which is the present market for fairly round lots.

Copper Nails are now 21½ cents per pound, as against 19½ cents before the changes began.

Copper Bolt sympathizes with Sheet Copper and is quoted as a rule at 21 cents, base, against 19 cents three weeks ago, although prices on this commodity fluctuate somewhat according to diameters and the source of manufacture.

Brass Wire is variously quoted at 22½ and 2 per cent. discount from list, while in some quarters 20 per cent. is asked in medium quantities, as contrasted with 25 per cent. discount formerly given.

Braced Tubing, both Copper and Brass, is now quoted at from 27½ and 2½ to 27½ and 7½ per cent. discount, as against 30 and 5 per cent. formerly, the range in price depending mainly on the quantity taken.

Axles.—The condition of the Axle market has of late undergone no important change, although the fact that

the manufacturers were obliged to place their contracts for Steel at an advance in price over that of last year should give a stronger tone. There is no agreement among makers as to price of Axles, and quotations made by different producers lack uniformity. Notwithstanding the announcement of somewhat higher prices by some manufacturers, the market appears to be as unsettled as at any time within the past year. Under these conditions it is difficult to quote exact prices, but the following represent the market fairly well except on large orders, on which concessions are made:

Iron or Steel Axles.

Concord, loose collar.....	4¼ to 4¾c.
Concord, solid collar.....	4¾ to 5¼c.
No. 1 Common, loose.....	3¼ to 3¾c.
No. 1½ Common, new style.....	3¾ to 4¼c.
No. 2 Solid Collar.....	4 to 4½c.
Half Patent:	
Nos. 7, 8, 11 and 12.....	75 to 75 and 5 %
Nos. 13 to 14.....	70 and 10 to 75 and 5 %
Nos. 15 to 18.....	75 and 10 to 75 and 10 and 5 %
Nos. 19 to 22.....	75 and 10 to 75 and 10 and 5 %

The demand is good, and an excellent business is looked forward to by manufacturers.

Horseshoes.—The outlook for fall business as a whole appears to be excellent and so far as we are informed there is nothing in the near future likely to disturb the schedules of agreed prices. While manufacturing interests outside of the Horseshoe Association assert that the manufacturers so allied to regulate prices represent only about 65 to 70 per cent. of the consumption of the country, there is no disposition to disturb present price conditions. There has been an effort on the part of the jobbers of Horseshoes in the South and West to have the manufacturers of this line establish restricted prices. Important interests would doubtless think more favorably of this venture were the total percentage of product in agreement larger, say, 90 per cent. or thereabouts. Prices are firm notwithstanding a special effort of a Western catalogue house to market Shoes much below the regular schedule, but it is claimed that these Shoes are not of best quality. In this connection there appears to be increasing discrimination regarding grade of material, style and finish on the part of horseshoers, which is reflected by the jobbers in placing orders. Manufacturers making a specialty of high grade stock have no difficulty in distributing their product at satisfactory prices. This feature of the trade was given force some time ago by a determination on the part of leading makers to discontinue marketing "seconds," thus emphasizing to consumers the inherent superiority of a high grade article, at the same time causing them to realize that relative values depend more on the grade of material and finish than on the price. In the South, where yellow fever has existed, it has exerted some influence on the disposition of this product, but improving conditions will doubtless minimize its effect. Prices, as heretofore, are \$4 per keg for iron and \$3.75 per keg for steel, at Pittsburgh, with the all rail rate of freight from Pittsburgh to destination added to invoice regardless of where the Shoes are made. Extras also are unchanged and also the quantity rebates to the jobbers, who do not, indeed, in all cases refrain from cutting the price slightly.

Rope.—A continuance of a fair demand is reported by manufacturers. Manila Hemp is quoted higher; also Sisal Hemp. The stronger Hemp market, if it holds, may have a tendency toward strengthening the market for Rope, which has been reported irregular for some time. General quotations on the basis of 7-16 inch diameter and larger are as follows: Pure Manila, 11½ to 12 cents; Pure Sisal, 10 cents; No. 2 quality Sisal, 8 cents per pound, the above figures having been shaded ¼ to ½ cent per pound, according to seller and buyer.

Window Glass.—Some manufacturers who had signed the workmen's "flat scale" of wages have commenced operations. These are comparatively few in number, and are, according to report, largely co-operative or semi-co-operative concerns. The manufacturers who are members of the National Association of Window Glass Manufacturers favor the "sliding scale" of wages, and an attempt is being made by some of these factories to see

if they can obtain workmen enough to man their factories. Other makers propose to delay starting their factories in order to strengthen the position of those who are trying to make a start. Under these conditions the output of Glass for September will probably be light. Local quotations are as follows: The first two brackets of B single, 90 and 10 per cent. discount; all B sizes above, 89 per cent. discount; all A sizes, 88 per cent. discount.

Linseed Oil.—A large Seed crop is predicted, but the amount of Oil in crushers' hands is limited. Prices are firmly maintained for immediate deliveries, while contract prices range from 36 to 38 cents for State and Western Oil, at which prices considerable business has been done. Demand for prompt delivery is confined to small lots. New York quotations for prompt deliveries are as follows: City Raw, 54 to 55 cents per gallon; State and Western Raw, 52 to 53 cents per gallon, according to quantity.

Spirits Turpentine.—The market has been advancing and strong, in sympathy with like conditions in the South. Prices which have been reached at this point have had a tendency to check demand. New York quotations are as follows, according to quantity: Oil barrels, 64½ to 65 cents; machine made barrels, 65 to 65½ cents per gallon.

DEATH OF HENRY L. SHALER.

HENRY L. SHALER, president of the Russell Jennings Mfg. Company, Deep River, Conn., died at Los Angeles, Cal., on the 27th ult. from blood poisoning. Mr. Shaler was born in Shalerville in the town of Hadam, Conn., July 17, 1825. His education was obtained at Brainerd Academy. After serving an apprenticeship to his uncle, Alva Shaler, at the tanner's trade, Mr. Shaler went to Deep River in 1845, where he was employed by Baker & Bigelow in hard wood turning, and later by George Read & Co., sawing ivory for their comb business.

About 1847 he entered the employ of Stephen & Russell Jennings, manufacturers of Bits, Augers, &c., and continued in connection with this business through its various changes, and later on with the Russell Jennings Mfg. Company, until his death. Shortly after Stephen Jennings' death Russell Jennings and his son, Charles, succeeded to the business. Charles R. Jennings having died soon after his father had secured the patent (in 1855) on the now well-known Jennings Extension Lip Bit, Mr. Shaler was left in full management of the manufacturing department under Russell Jennings' patent, laboring under many discouragements but with indefatigable energy and perseverance, never forgetting that quality and not quantity would determine the success of the business.

In August, 1865, Mr. Jennings having purchased the Turner & Day auger shop at Chester, the greater portion of the business was removed to that place from Deep River, where more room and power could be had to test their faith in the manufacture of the new Bit, which was eventually rewarded by abundant success. Mr. Jennings died in 1888 and in 1895 the Russell Jennings Mfg. Company was incorporated. After the decease of S. H. Jennings Mr. Shaler was chosen president and held that office until his death. Mr. Shaler was a trustee and director of the Deep River Savings Bank and was deeply interested in everything of a public nature that had for its purpose the upbuilding of Deep River.

Mr. Shaler's first wife was Harriet Newton Jennings, daughter of Russell Jennings. She lived but a year after her marriage. In 1875 he married Miss Fanny Tyler, daughter of Ephraim Tyler of Deep River, by whom he is survived. For the past few years failing health and age compelled Mr. Shaler unwillingly to leave his home for recuperation, while the general superintendence and management of the manufacturing were entrusted to others.

TRAVERS BROS. COMPANY, 41 Worth street, New York, has purchased the plant, good will and business of the New Bedford Cordage Company, New Bedford, Mass. The Travers Company will continue to operate the plant in the production of the same goods which have for a number of years been made at the mills.

WASHINGTON LETTER.

RESTRICTION OF OUTPUT
IN HARDWARE TRADE.

WASHINGTON, D. C., September 5, 1905.

IN a forthcoming special report of the Bureau of Labor upon the restriction of output by manufacturers and labor unions a chapter is devoted to a general statement regarding agreements of associations and pools in the Hardware trade designed to regulate prices or output. The report is the result of an elaborate investigation begun more than a year ago, and some changes have taken place since the information here presented was gathered by the bureau's agents. This feature of the report is as follows:

In the manufacture of the great variety of products under the heading of "Hardware" there is a large number of agreements, associations and pools designed to regulate prices or output. It is estimated by persons familiar with the industry who have been interviewed that one-third to one-half of the several lines of goods are controlled by pools that restrict, regulate or apportion output, and that in the other lines there are a number of "gentlemen's agreements" as well as formal compacts regulating prices. The difficulty in making an estimate of the prevalence of these associations, even by those most familiar with the trade, is found in the fact that these agreements and combines are fluctuating and generally secretive, and that an association which at one time was flourishing may have disappeared. For example, an association which six months ago controlled about two-thirds of the total output of Shovels, and had a stringent provision restricting jobbers to dealing with their members, dissolved just prior to the present writing. Generally the combinations weaken in times of severe competition, owing to defects in the arrangements for binding members, while in times of prosperity the mutual undertaking is lived up to.

Since these combinations or agreements pertain each to a single line of product, a firm or company manufacturing several lines is often party to several combinations. The strength of the association is usually greater when the industry has been developed in establishments on a large scale with but few competitors, as in the case of Screws, Horseshoes, Axes, Hatchets and Ammunition. Such combinations sometimes control 90 per cent. or nearly 100 per cent. of the country's output, while in weaker associations as low as 40 per cent. of the total output may be represented in the agreement.

In the stronger combinations the usual arrangement is an apportionment of output among the members in proportion to the capacity of their plants. This apportionment is in the hands of a commissioner, selected by the association, who is authorized to examine confidentially the books of each member, the members thus remaining ignorant of their fellow members' business. The total output having been decided upon in advance and the apportionment made, the commissioner determines by his inspection the extent which each member has exceeded or come short of his allotment during the stated interval. If he has exceeded his allotment he pays a certain assessment into the fund of the association, and if he has fallen short he is paid a proportionate award from the fund. The commissioner in this way maintains a clearing house for the members, balancing the output of each within the limits of the total regulated or restricted output. There is also a penalty for selling below the prices agreed upon—namely, a forfeiture of part or all of the deposit which the members have pledged as a guaranty.

In some of the combinations an additional step toward regulation of output is taken when a central selling agency is established, usually under the management of the commissioner. In the majority of pools, however, each manufacturer markets his own product, and the adjustment is made as above stated.

In the price fixing agreements there is of course no commissioner with authority to apportion output, but there is frequently a formal contract providing for penalties. Such agreements exist among the manufacturers of Hammers, Cabinet Locks and Builders' Hardware.

The combinations agree both upon jobbers' and wholesale prices and upon retail prices. In the case of several combinations there exists considerable antagonism between the jobbers and the manufacturers, the jobbers contending that the manufacturers should not sell direct to retailers, department stores and mail order concerns. The manufacturers, however, in all cases maintain their privilege of selling direct to retailers at prices varying by fixed percentages from the jobbers' prices. They do not dictate to the jobber the prices which he shall charge to the retailer nor to the retailer the prices he shall

charge to the consumer. The prices vary both for jobbers and retailers according to the importance of the customer, the "A" list, for example, receiving a discount greater than that granted to the "B" list, and so on. In the Skate and Lawn Rake combination the manufacturers have apportioned the jobbers among themselves, each manufacturer doing business exclusively with his list of jobbers. Each jobber receives a rebate at the end of the year, provided he confines his purchases to his designated manufacturer, and this provision has served to sustain this combination in successful operation for several years.

The Wood Screw pool has been in existence for about two years, with a commissioner in charge of the funds, apportioning the output and equalizing excesses as above stated. Members forfeit penalties if they sell below the established prices, and there is no common selling agency. There are three scales of prices, one for the large jobbers, another for medium jobbers and a third for small jobbers and retailers.

Axes and Hatchets are controlled by two separate pools. Horseshoes are controlled in the same way through a commissioner. There are two grades of jobbers, according to their importance. Metallic Ammunition, Powder and Shot to the extent of 90 per cent. of the output are controlled by an association made up of three concerns. This combination has been in successful operation for several years.

The above are a few of the more important agreements and pools which are known to be in existence at the time of making this report. Besides those mentioned there is reasonable certainty that similar agreements exist in many lines, but the evidence usually rests on the identity or similarity of the price lists and discounts issued by competing manufacturers. In some cases, as those above mentioned, the identity is apparent and acknowledged, while in others various devices and subterfuges are introduced in order to conceal the existence of the agreement. Customers and purchasers often disagree as to whether a given line is "open" or "closed," and the manufacturers themselves are not willing to give the needed information.

W. L. C.

HIBBARD, SPENCER, BARTLETT & CO.'S
SEMICENTENNIAL.

"FIFTY Years of Progress" is the title of a handsome 32-page brochure just issued by Hibbard, Spencer, Bartlett & Co., Chicago, to celebrate the semi-centennial anniversary of the founding of that great Hardware jobbing house. The history of the house is traced in outline from the establishment of the firm of Tuttle, Hibbard & Co. in 1855. Here it was that William Gold Hibbard began his career of 48 years of management of a business that grew from comparative insignificance to its present commanding position in the trade. The first store of the firm was 24 feet wide by about 140 feet deep, located at what was then 45 South Water street, or immediately opposite the present main building of the company. Two years later the stock was destroyed by fire and a new beginning made at 32 Lake street. In 1860 a second move was made to 62 Lake street. Five years later Franklin F. Spencer, who had been the Western representative of Jewett & Root, Stove manufacturers of Buffalo, N. Y., joined with Mr. Hibbard in buying out the interests of Mr. Tuttle and the other partners in the original firm, the firm name being changed to Hibbard & Spencer. A third removal was made in 1867 to 92 and 94 Michigan avenue, where in 1871 the building and stock were destroyed in the great Chicago fire. Temporary quarters, little more than sheds, were erected on the lake front and occupied until a new building at 30-32 Lake street was completed. In this new home the business thrived and grew with the years, store after store being added until the firm occupied all of the five-story buildings running from 32, on the corner of Wabash avenue, eastward to and including 16, with a large warehouse on the north bank of the Chicago River.

In 1877 the firm name became Hibbard, Spencer & Co., and in 1882 the name was changed to its present form, the officers being Wm. G. Hibbard, president and treasurer; F. F. Spencer, vice-president; A. C. Bartlett, secretary; Charles H. Conover and James W. Nye, directors. On the death of Mr. Spencer, in 1890, Mr. Bartlett became vice-president and Mr. Conover secretary. The business of late years has been conducted on a profit-sharing basis in that trusted employees were rewarded

with shares in the stock or the earnings. There are many such partners in the business now, including the following who hold titles: A. C. Bartlett, president; Charles H. Conover, vice-president; W. G. Hibbard, Jr., second vice-president; J. J. Charles, third vice-president; Frank Hibbard, fourth vice-president; A. M. Graves, secretary; C. B. Whipple, assistant secretary; E. G. Clark, treasurer; F. L. Macomber, manager of credits; F. D. Hoag, cashier; F. C. Bartlett, H. B. Lyford, F. H. Warren, Henry Beneke, H. W. Chester, Pritchard Stewart, W. A. Sickels, directors.

A special feature of this very interesting publication is the reproduction of the portraits of 58 employees who have served over 20 years with the company. Portraits of Messrs. Hibbard and Spencer and of the present officers and directors are also given as well as illustrations of the various premises occupied by the concern from its founding to the present time.

BRITISH LETTER.

Offices of *The Iron Age*, HASTINGS HOUSE,
NORFOLK ST., LONDON, W. C., August 26, 1905.

The Week's Market.

THE agricultural outlook may now be deemed to be good, and this has created a feeling of hopefulness throughout the Hardware and allied industries which after all, directly or indirectly, depend to an enormous extent upon agriculture. There is an increase of over 16,000,000 bushels, and although prices have fallen it is certain that farmers will be possessed of larger financial resources than has been the case for some time, and they will thus be enabled to buy more largely and even make up for arrears.

In regard to the export trade, there is no reason to complain. The quantity of Hardware sent abroad continues to surpass last year's record, even though that was so much in advance of 1903. Our East Indian possessions occupy a commanding position among overseas customers. South Africa is unable to maintain the lower level of imports which followed the boom at the close of the war. Australia too has been a smaller customer than last year, but New Zealand has done slightly better, and Canada for the month just passes last year's total, which it may be pointed out was exactly double that for 1903. In the South American States also our Hardware exporters continue to find business exceedingly good. Chile, it is true, did not take half the quantity of goods that it did last year, but on the other hand Argentina almost doubled her purchases, and those of Brazil again grew substantially. On the Continent of Europe there has been an increased demand from Germany, the Netherlands, France and Spain and also Russia, but with other countries trade has shown a declining tendency.

Brass and Copper.—The value of the exports both of Brass and of Wrought Copper is substantially above last year and the year before, and in the case of wrought material the explanation is largely furnished by exceptionally heavy shipments to India. Germany also has been buying heavily in this direction.

Files.—The File trade is also improving. In some instances, although perhaps not all, manufacturers find the demands made upon them quite as much as, if not more than, they can cope with as expeditiously as their customers would desire. The foreign trade is better than could have been expected, even the orders coming from Russia being more satisfactory than was thought probable in view of the tremendous drain being made upon the resources of that country by the war. The demand for hand cut Files is still increasing. With regard to this branch of the industry, it is claimed that it has recovered all it lost in recent years to American competition.

Tools.—The demand for Tools for excavation and similar purposes shows some improvement. Some orders have come to hand from South Africa for Mining Tools and Agricultural Implements, and the improved demand from South America for Tools utilized in railway work is also helping to find more employment. The fact that the coal mining industry throughout the country has been

so depressed has been reflected in the Tool trade, and it is good news to find that in some districts, though by no means in all, more work is being done in the pits. All the same a good many of the manufacturers of Tools, whether excavating, agricultural or engineering, closed their works beyond the mere Bank Holiday.

Silver Ware.—The Silver and Plate trades have been passing through a period of depression, and there is still considerable inactivity. The general impression among the manufacturers is that there is little chance of any improvement being recorded until after the termination of the war in the Far East. A few fortunate firms say that in certain classes of goods the season has been on the whole a satisfactory one, but the opposite is the tale told by most.

The recent Horn and Bone sales in London were not marked by much briskness. The supply of Deer Horn was slightly in excess of that on offer at the preceding auction, and of 120 tons offered 106 tons were sold. The market was sluggish and prices showed a slight reduction. There was, however, an extraordinarily good demand for Buffalo Horn, and full rates were maintained. A fair proportion of the 82 tons found its way to the Continent. There was a poor demand for Horn Tips, but Horns suitable for Machete and Hunting Knife Scales were in request, and the prices showed an advance of from 10 to 15 per cent. The Ivory trade is extremely dull.

German Screws in Great Britain.

American exporters will be interested to hear that within the last week or so German Screw manufacturers have formed a syndicate and advanced prices nearly 40 per cent. The price at which for some years German Screws have been sold on the English market has been less than half the cost of the English-made Screws, the English firm which commands the market having sold their Screws at 60 per cent. discount off the basis list, whereas the German makers owing to competition between themselves have sold enormous quantities at 80 per cent. discount, with a long cash discount in addition. It may be a question as to whether the English makers have not obtained monopoly prices, but there certainly appears to have been no necessity for the ruinously low prices of the German competition. The Germans appear at last to have given recognition to this, and the abnormally low prices hitherto obtaining are no longer in existence. German Screws have greatly improved in quality, and the best makes are now little if at all inferior to the English Screws. It is surmised that the present great advance in price has not been made without some instigation from the firm which has made this article of general utility a practical monopoly so far as the English market is concerned. Perhaps more information may be forthcoming shortly upon this very interesting point.

It may be added that the trade in German Screws has of late years aggregated many millions of gross. There seems some reason to believe that the advance in price will be maintained, and it is even suggested in well informed quarters that German Screws will be shortly entirely taken off the English market.

THE MERCHANTS' LIGHTERAGE COMPANY, Chicago, has just received from a Buffalo shipbuilder a new boat which is named the Charles H. Conover, in honor of the vice-president of Hibbard, Spencer, Bartlett & Co., principal owners of the Lighterage Company. The boats of the Merchants' Lighterage Company ply on the Chicago River, carrying incoming and outgoing freight between the wholesale districts and the dock terminals of the railways and steamship lines. Cartage expense is in this way done away with for all points accessible by water.

A DECISION has been rendered in the United States Circuit Court for the District of Connecticut in favor of the Marlin Firearms Company, New Haven, Conn., as the result of suits brought by it against the Savage Arms Company, Utica, N. Y. The suits were brought for the purpose of protecting the first named company, which believed that patents owned by it were infringed by the Savage Rifles.

TRADE WINNING METHODS.

This department is for the description of approved methods of carrying on and extending business, and a cordial invitation is given to merchants to co-operate in the effort to make it suggestive and of practical use to the trade.

"THE BARRETT SHOP AND ITS WORK."

BARRETT HARDWARE COMPANY, Joliet, Ill., which does an extensive business in Shelf and Heavy Hardware, Factory and Mill Supplies, Stoves, &c., also conducts a large shop in which plumbing, steam and hot water heating, roofing and kindred work is looked after. A description of this shop, with a diagram showing its arrangement, is given below.

Calling attention to the shop and its facilities, the company has issued an eight-page folder, entitled "The Barrett Shop and Its Work." This folder tells its story so well that we reproduce the different chapters herewith:

THE BARRETT SHOP.

There is really only one way to secure satisfactory results and the lasting good will of customers. And that is to turn out the best grade of work at all times—work that is durable and permanent. That is the Barrett Way. It is the first law of the Barrett Shop.

Twenty-five capable men are always at your service. They understand their business. They know just how to complete a given piece of work in the most satisfactory and economical manner. And they do it.

That is the way the Barrett Shop has established a reputation for excellence. No matter whether it is a five-cent or a hundred-dollar job, it receives the most careful and painstaking attention. We give you the same good service we would demand ourselves.

And our prices are always moderate and reasonable.

HOW IS YOUR ROOFING?

The life of any building depends very largely upon its covering. Let the roof get old and in poor condition, and in a very short time the whole structure will begin to show signs of decay.

So you will readily appreciate the economy of good materials and good work in the first instance. It may cost a trifle more in the beginning, but it pays well in the end. And, after all, the real point is how long a thing will last, rather than how cheaply it can be done.

We can furnish you with many different kinds of good, serviceable Roofing. But we especially recommend our — Roofing. It is one of the very best composition roofings made. Its cost is no more than corrugated iron, and yet it gives a great deal better service. It is easier to put in place, and needs much less care and attention after it is on.

EAVE TROUGHS AND CONDUCTORS.

Of almost equal importance is the system of gutters for carrying away the water that gathers on the roof. There are so many ways in which work of this kind may be slighted, both in the quality of the material used and in the erection of the work itself, that the greatest care should always be exercised.

But when the Barrett Shop does your work you can always rely upon it being well done. The best galvanized iron is used in the construction of all work of this character. It is strong and substantial to the highest degree, and the liability to rust is less than in other material.

All joints are put together and soldered in the most careful manner, and the gutters and pipes are hung and adjusted so as to carry away all the water without overflow or waste.

ABOUT HEATING SYSTEMS.

The extremely severe weather of the past few months has undoubtedly set many farmers to thinking about the question of how best to heat their homes in a satisfactory manner.

No matter how well you may like a cool sleeping room, you probably do not enjoy getting up and dressing in a freezing temperature. And it is certainly neither pleasant, easy nor economical to keep several stoves in service during the long winter months.

So that brings us up to a single heating plant of some kind. And we recommend for your consideration — Hot Air Furnaces and — Furman Boilers. With either of these systems installed your heating problem will cease to be a matter of worry.

The first cost is not so great, and the convenience of heating the whole or any part of the house at pleasure is a matter of comfort and satisfaction that is well worth the outlay.

THE BATHROOM.

This is another of the modern improvements now being adopted quite generally in country homes. You know there is nothing more refreshing than a good all-over bath, and it is doubly satisfying after the hard work of a summer's day.

The more you use a bathroom the more you will appreciate its convenience.

The cost, of course, depends very largely upon how elaborate your bathroom is to be. It can be made very expensive or reduced to a very modest sum. It is not at all necessary that it should be great.

But no matter how elaborate or how simple your desires may be, we can do your work at the most reasonable cost consistent with good service.

AND IN ADDITION.

There's a multitude of ways in which the Barrett Shop can be of service to you other than those already mentioned.

If you need a good Pump—we have them at all prices.

If it's plumbing or piping of any kind—we'll do your work in the most satisfactory way.

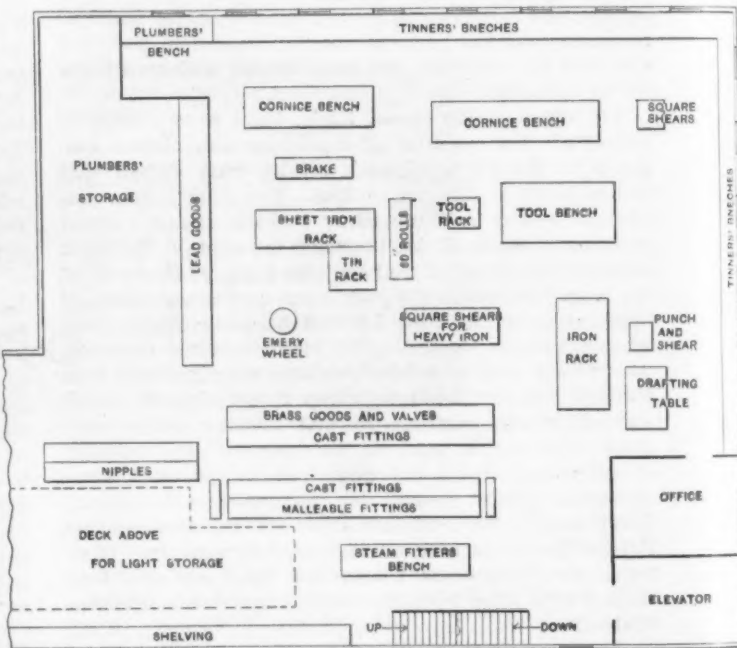
If you want some utensil or article specially made—we'll be glad to turn it out for you.

If you have a repair job of any kind—don't hesitate to bring it to us, even though it be small.

We shall always be glad to talk with you and furnish estimates on any work you may have.

Good work and reasonable prices will always prevail.

As if the reasons advanced why the public should turn over their jobs to the company were good and suf-



General Arrangement of Benches and Machinery in Barrett Hardware Company's Shop.

ficient, the last page or back of the folder bears the inscription "Let the Barrett Shop Do Your Work."

The Shop Itself.

The shop is located on the second floor of the company's building and covers a space 64 x 72 feet. The ceiling is 12 feet above the floor. Light is secured from 16 windows, 3 x 9 feet, on two sides of the shop and a large skylight in the center. The tinnings' benches are arranged on the sides of the shop containing the windows. Parallel with these on one side are the cornice benches and brake, and on the other benches holding folders, vises, double seamers and other machines of a heavy character. At a point within the angle formed by the tinnings' benches, where they may be readily reached from either side, are racks holding the smaller machines, stakes, &c.

In one corner of the shop near the entrance is the glass partitioned office, in which are kept shop orders and records. The darker portion of the shop is utilized for stock and Pipe Fittings, of the latter of which a large line is carried, and near the fitting racks is the steam fitters' bench.

In the center of the room is a five-horse-power motor, with shafting which runs an emery wheel in the shop and buffing wheels in the stove polishing room just above it, and it is intended also to run a drill press, small pipe threading machine, &c., in the near future. All pipe from 2½ to 8 inch is handled and cut in the basement, where are installed another five-horse-power motor and a No. 8 B. & K. pipe machine.

The shop is under the direction of E. C. Barrett, secretary and treasurer, who gives particular attention to the plumbing and steam fitting departments, while the sheet metal end is in charge of the foreman, who also does the drafting and pattern cutting. The records of costs, time keeping and checking of goods is in the care of the shop clerk, who also assists Mr. Barrett and the foreman in estimating. The permanent shop force, in addition to the executives, consists of two plumbers, two steam fitters, ten sheet metal workers, five helpers and two stove blackers, to which number others are added as occasion demands.

Communication between all the floors of the Barrett establishment is secured by means of speaking tubes, and all material is handled by an electrically operated elevator with a capacity of three tons.

A MODEL KITCHEN FLOAT

THE accompanying illustration reproduces a float gotten up by A. E. Small & Co., Hardware merchants, Crete, Neb., for a trades display procession in that town.



A Model Kitchen Float.

Three prizes were awarded to the most deserving displays, and the first of these, \$25, was won by the Messrs. Small. Galvanized Chimney Tops and Stove Pipe were used for the frame work. The signs "Model Kitchen" on either side of the float had galvanized eave trough above and molding below. Forward on the float was a Cistern Pump in operation, the water being pumped into a Sink, while in the rear was a handsome Refrigerator. Hot biscuits, manufactured in the "kitchen," were distributed to the multitude as well as fans bearing the firm's advertisement.

HINTS TO HARDWARE MERCHANTS ABOUT GETTING NEW BUSINESS.

Established trade will take care of itself, but the new customer of to-day is the old one of to-morrow, and so the paths and byways of every Hardwareman's individual territory ought to be gone over frequently for the new customer. He exists, so all that need be done is to find him.

III. THE BLACKSMITHS' TRADE.

BY H. A. JOHNSON.

TUCKED away in out of the way corners, in town and out in the country, in every Hardwareman's baillwick are those horny handed disciples of Vulcan, which type Longfellow has immortalized in his famous old "Village Blacksmith."

Every mother's son in this trade is solely a Hard-

wareman's customer for cellar and shelf goods. Perhaps the blacksmith receives less attention than any other class of workmen. Oftener than otherwise he is a rough, tobacco chewing individual, whose first visit in town is to the saloon. But all the same he uses a lot of Tire Steel, Wagon and Carriage Hardware, Horseshoes and Nails during the course of the year, so his trade is

Worth Looking After.

I have seen and known a great many blacksmiths, and while they have their faults they are a most loyal, hearty, whole souled lot. Nearly all of them are fishermen or hunters, and all of them have families, while most of them own their shop and home. In his moments of idleness the blacksmith is not unsociable, but the hammer and banging nature of his calling makes him taciturn, reserved and given to his own thoughts. As I have already pointed out the blacksmith must necessarily be a great user of Hardware staples.

Perhaps one of them has been splitting up his trade, or not buying as much of Hustle, Catchem & Co. as he formerly did. Let us send him this letter, then:

Mr. T. I. Tichenor, Hyde Park, N. Y.

DEAR MR. TICHENOR.—Mr. Catchem remarked to me a moment ago that he hadn't seen you in the store here in quite some time. I haven't, either.

We hope you have not been laid up with your old trouble, and that you have not forgotten us. This letter proves we have not forgotten you. No, indeed. Men of your kind are easily remembered. We wish there were more like you.

Did the goods you got of us last time you were in work up all right? Don't forget that goods bought of us can always be returned, changed, credited or money

refunded, if it be necessary. If we could see clear through everything we buy, flaws would never get into stock, but if ever you find a flaw in our goods let us know about it. We're as much interested as you are.

Don't forget that we have a full stock of everything that you use. You don't have to come after goods. Order by mail if you can't come. We'll attend to getting the goods to you and split the freight or stage charges willingly.

We believe you can act as a sort of agent for us in your neighborhood. Suppose you know where there's a house or barn going up. That means a bill of Hardware is needed. Send the owner to us. We'll do the right thing by him and allow you 10 per cent. for your commission. This is, of course, confidential.

If we can do anything for you at any time, let us know, and with best regards we are,

Very truly yours,

HUSTLE, CATCHEM & COMPANY,

D. G. H.—E.

Per D. G. HUSTLE.

Isn't it rather reasonable to think that letter will give him something to think about as he shapes a Shoe and shrinks Tires the next day? Will he not think he is appreciated in town? And won't he let that 10 per cent. proposition sink down into the innermost recesses of his business heart? I think it would have all those results and more.

Notice again the second paragraph of that letter, wherein his "old trouble" is spoken of. That is the safest generality of the whole letter. Every man beyond the "Osler limit" has a real or fanciful ailment, and the man who is spoken to about it feels a sort of admiration for the speaker. This is another wile of the clever traveling man.

10 Per Cent. Commission.

Now about that 10 per cent. clause: A firm I know are doing that and it is demonstrating its success. They reason that a new customer sent by a blacksmith takes it out in trade, so the 10 per cent. commission means less than that in actual cash. Besides the blacksmith is getting something for nothing legitimately, and you may rest assured that he will feel pretty good over it.

There's no danger of the letter being shown around. The confidential nature of it precludes that. Blacksmiths are not close enough together for daily intercourse anyway.

To use this letter to the best advantage compile a list of every blacksmith in your territory, have the letter typewritten and copied on your firm stationery by mimeographic or printed process, the name and address to be separately inserted afterward. They can be sent out under 1 or 2 cent postage, but the 2-cent method is best. Counting stationery, stamps, printing and time, a list of a hundred ought not to cost over \$5. You'll have to figure rather hard to see how \$5 could be spent to better advantage.

CATALOGUE HOUSES AND LOCAL R. R. AGENTS.

E. W. EVENSON, Spokane, Wash., the energetic secretary of the Inland Empire Implement and Hardware Dealers' Association, sends out circular letters to the members at frequent intervals calling attention to matters connected with the organization which have a direct bearing on the successful and enterprising conduct of the Hardware and Implement business. A recent letter, No. 14, deals with the subject of catalogue house competition and describes a method of sending goods to the consumer by which, through misrepresentation of the contents of the box or package, these establishments are able to secure a saving in freight charges. In the instance to which special reference is made the box was marked as containing fourth-class goods, despite the fact that the contents should have been represented as second-class. Mr. Evenson's letter is as follows:

Inasmuch as one of the principal reasons why this association was organized was to aid members in fighting competition from what are commonly called catalogue houses, I deem it my duty to call your attention to the following incident which recently reached my attention. Anything bearing on the catalogue house evil should receive the earnest attention of every man in the trade. The best brains in the trade are being brought to bear upon this vital question. You can afford to give some time to it. The incident was this: While at a depot in a town in the "Big Bend" country I saw a box from a well-known catalogue house marked "Iron Wedges." As there is practically no timber in that country I became interested in knowing how so many "Wedges" were to be used. This box filled with "Wedges" would weigh 300 pounds and would last the trade in that town five years. I turned the box over with ease. It was clearly a fake marking. I called the railroad agent's attention to it. He told me it was none of my business. I went back to town and called the attention of a dealer (also a member) to what I had seen. This is what this member told me:

Yes, I was aware that that shipment was coming to town. I had figured on a bill of goods for the man who gets that box of "Wedges," so I happen to know what the box contains. Some Locks, some Tools, and a Hay Carrier outfit. These are all second-class goods. Wedges take fourth-class rate. You see that railroad agent is a large patron of catalogue houses himself. He buys many of his goods from and is favorable to them. Many boxes coming to this town from catalogue houses are marked as containing fourth-class goods, such as Sad Irons, Bolts, and in fact anything taking a fourth-class rate. The railroad agent, being favorable to catalogue houses, always passes the boxes, no matter what they are marked to contain. You bet I pay the regular class rates on all my goods. If they look suspicious he opens the boxes and corrects the billing, and I have to pay on all the goods in the box the highest rate that can be applied to any one item in the box.

Now it so happens that I know what there is in that box you mention, for I figured on a bill of goods with that party a few weeks ago. That box marked Wedges, as a matter of fact contains 16 Door Locks with Butts to match, and some Hay Carrier and kindred tools and goods of like nature. There is no use kicking to the railroad agent. He is a pro-catalogue house man and he will not budge.

I then went to the railroad agent with a plain statement of the case and was told that it was none of my business, but I made it my business and now there's "something doing" for that agent at headquarters.

Just one word and I am through. I want to ask you: Is your local railroad agent a catalogue house man? Perhaps it will pay you to find out. This is a good way to keep track of all shipments reaching your town through the freight depot from catalogue houses. Agree with your local drayman to pay him a certain amount for each shipment which he sees come to your town from a catalogue house. Find out through him who gets it, what the shipment contains, if possible, and all other data regarding the same. Then adopt your own plan of getting the business from the parties whom you find sending East for goods. You can get this business if you go after it.

PRICE-LISTS, CIRCULARS, &c.

Manufacturers in Hardware and related lines are requested to send us duplicate copies of catalogues, price-lists, &c., one copy for our Catalogue Department in New York and another for our London office; and at the same time to call our attention to any new goods or additions to their lines, of which appropriate mention will be made besides the brief reference to the catalogue or price-list in this column.

MARBLE SAFETY AXE COMPANY, Gladstone, Mich.: "Marble's Specialties for Sportsmen." The catalogue describes practically everything needed for the proper equipment of the hunter or the fisherman, including Pocket Axes, Camp and Chopping Axes, Knives of almost every description, Firearms, Ammunition, Firearm Parts and Fishermen's Outfits. The catalogue is 5 x 7 inches, a handy size to be carried in the pocket, which latter fact is apt to be taken advantage of by the sportsman because of the book's preface on "Hints to Hunters."

FULTON MACHINE COMPANY, Watertown, N. Y.: Catalogue of patent Vises with price-list of extra parts.

HANDY THINGS COMPANY, Ludington, Mich.: Catalogue of Hardware and Woodenware Specialties, Gun Cleaning Rods and Implements, wide runner Skates, &c.; also catalogue referring to plain, polished and enameled Wood Handles, Knobs, Pall Woods and variety Wood Turning.

A. B. & W. T. WESTERVELT, 102 Chambers street, New York: Booklet entitled "The Science of Carriage Washing," referring to Perfect Carriage Washers.

AMERICAN FORK & HOE COMPANY, Cleveland, Ohio: Handsome catalogue F, printed in two colors, covering a complete line of hand Farming and Garden Tools, Handles, Ferrules, Wheelbarrows, &c.

A. J. HEMPHILL, 52 Dey street, New York: Price-list circular referring to Hemphill's U. S. A. Steel Tray and Star Brand Iron Bound Barrows.

TOLEDO STAMPING COMPANY, Toledo, Ohio: Circular price-list of Shovels, Spades, Scoops and Ditching Tools.

STANDARD STAMPING COMPANY, Marysville, Ohio: Descriptive circular with price-list on Standard Carriage Heaters.

GRANITE STATE MOWING MACHINE COMPANY, Hinsdale, N. H.: Catalogue just issued of Lawn Mowers, including the Granite State, with and without ball bearings; Queen, with and without ball bearings; New Ideal, Mystic, a ball bearing Mower at a moderate price; Rover, same construction as Mystic, but with plain bearings, and Leader, the latest addition to the company's line of low priced machines.

DREW ELEVATED CARRIER COMPANY, Waterloo, Wis.: Catalogue of Automatic Drew Carriers, calling attention to their wide variety of uses, giving directions for installing, &c.

SAMUEL WINSLOW SKATE MFG. COMPANY, Worcester Mass.: Complete catalogue of Ice Skates, with 1905 cipher telegraph code, which replaces all previous codes.

BUTLER BROTHERS, 495 and 497 Broadway, New York: "Our Drummer," 1905 fall catalogue of general merchandise, including a large variety of Hardware, with prices guaranteed during September or until their October catalogue is issued.

THE WOODHOUSE HARDWARE MFG. COMPANY, St. Louis, Mo.: Circulars and mailing card illustrating and describing the Simplex Patent Hasp Hook. Electrotypes will be furnished to merchants for catalogue use.

ON THE WARPATH.

BY OPPIDUM.

The following verses are apparently suggested by the experience of a long-suffering manufacturer who adhered to the terms of a price agreement which were ignored by his competitors. Many of our readers will be able to apply them to more than one line in which at one time or another broken faith has been followed by a break in the market:

Speaking of price agreements the wise have sought to maintain

To offset overproduction and the evils which flock in its train,

For the sake of a stable market and the hope of a living gain,

We who are far from holy have kept the faith to date,
Although our pride and output have suffered early and late,
Reaching the limit of patience, we accept the challenge of fate.

We have learned our lesson in silence; Revenge! is the word that's passed.

Tell all your stall-fed officials, and speed your salesmen fast!

Your labors have reached fruition; there's war to the knife at last.

Those confidential rebates and substitutions, too,
You may pack them away in camphor to rest till this fight is through.

We are calling our hosts to battle, as we called them forth of yore.

To-day sees an open market! And to-day we pay the score!

And as for all the faithful you have carried along on ice,
That loyal, trusting clientele who have paid you the market price,

Where no weakling dared retaliate, and the upright scorned to try,

We have marked them all for slaughter! You will find that your price is high.

We are much obliged for those stories of our swift, senile decay;

You will find we are fairly healthy when you meet the Lion at bay—

The Lion who fights in the open, tho' the Jackals scurry away.

The Panther lurks in the thicket, the lone Wolf skulks on the plain,

The Tiger will gorge with killing and go to his lair again,
But every beast in the jungle must make his allegiance known.

The Lion is still the Lion, and the Lion protects his own.

No need to hide in the bushes and leap from an ambushade;

Come right on out in the open and learn how a fight is made.

From Ocean unto Ocean we fling our gage of war!

To-day is the day of vengeance, the day that we pay the score!

L'ENVOI.

Seek ye a true comparison in predatory lust?
Individuals may be honest; Corporations? If they must!
But if others find it difficult, it's impossible for a Trust!

DEATH OF CHARLES BUCK.

CHARLES BUCK, Millbury, Mass., proprietor of the Millbury Edge Tool Works and one of the pioneer American manufacturers of Edge Tools, died at Sterling, Mass., August 24, aged 76 years. He had been in poor health for several years, but the end came suddenly. Mr. Buck was a native of Sheffield, England, and was born March 22, 1829, the son of Joseph Buck. His grandfather was a skilled worker on Edge Tools and for 30 years was manager of Newbold's factory in Sheffield. Charles Buck's father was an expert forger and finisher of Edge Tools and the son served his apprenticeship at the trade. There were three brothers—John, Richard T. and Charles—and all were experts in their father's calling when



CHARLES BUCK.

they came to America. Charles and Richard emigrated in 1853, having been preceded by John, who had found employment with D. R. Barton, Rochester, N. Y. Charles and Richard were welcomed at the same establishment, for Mr. Barton was endeavoring to meet the demand for a class of Edge Tools that would equal the English Tools and experienced men from Sheffield were necessary to the purpose. Charles took charge of the finishing department and remained with the Bartons for four years, when he came to the conclusion that he could manufacture Chisels and Gouges equal to any that were imported. So he formed a partnership with his brothers under the firm name of Buck Bros., establishing the business at Worcester, Mass., and this business relation continued until John withdrew from the firm. The other brothers continued as partners, removing the business to Millbury in 1864 and establishing the Riverlin Works. In 1872 Charles retired from the firm of Buck Bros. and in 1873 established a business of his own, which he conducted until his death, though not very actively during the past three or four years, retaining only a general supervision of its affairs. Charles Buck built up a prosperous business and his Tools achieved a wide and favorable reputation. For years he did much of his own tempering, being an acknowledged expert. Mr. Buck was thrice married and leaves six daughters.

THE J. D. WARREN MFG. COMPANY, Chicago, manufacturer of Hardware Store Fixtures, has issued a new price-list under date of August 1, referring to more than 350 different patterns of Cabinets, Bases, Counters, &c. The company not only manufactures the fixtures mentioned but will equip a Hardware store with all requirements in Shelving, Cabinets and other furniture in whatever designs are necessary to suit the form and construction of the building and the convenience of the firm.

A. M. Leach, Roseville, Ohio, has recently taken up plumbing and gas fitting in connection with his Hardware business.

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BUCKEYE FORGING & SPECIALTY COMPANY.

THE BUCKEYE FORGING & SPECIALTY COMPANY, Sebring, Ohio, has been organized with the following officers: O. H. Sebring, president; E. H. Sebring, secretary and treasurer, and W. R. Beatty, general manager. Since the reorganization Mr. Beatty has operated and managed the business with such skill as to warrant the installing of additional equipment to take care of the increasing business. During a recent week orders were received for 175 tons of Drop Forgings, which is the largest tonnage booked in one week in the history of the company. Mr. Beatty is a nephew of James H. Baker and associated himself with the Baker Chain & Wagon Iron Mfg. Company, Allegheny City, Pa., at the age of 14. At the age of 22 he had become the superintendent of the factory, which is now the Wagon Hardware department of the Oliver Iron & Steel Company, Pittsburgh. This position he resigned to accept that of general superintendent of the New Castle Forge & Bolt Company. The reorganized company is equipped with ample capital, and is preparing to carry on a vigorous campaign for the ensuing season. The company controls and manufactures the Renner Tubular Turnbuckle and also makes a complete line of Railroad and Drop Forgings, Upset Rods, Large Bolts, Nuts and Washers.

SAW TALKS TO RETAIL MERCHANTS.

E. C. ATKINS & CO., Indianapolis, Ind., are making short but exceedingly interesting talks to merchants in consecutive issues of *The Iron Age*. The following topics have already been touched upon in the series: "Quality," "Reputation," "Salesmanship," "Cheapness" and "Responsibility." In these talks the relation which merchants sustain to customers is pointed out, and special emphasis is placed upon the desirability of conducting business along lines which insure permanency and increase. The series will be continued in subsequent issues.

MISCELLANEOUS NOTES.

Lineman's Climbers.

The H. D. Smith & Co., Plantsville, Conn., has commenced the manufacture of lineman's climbers, which are described as made of the best material and by skilled mechanics. The spur is especially referred to as of proper height and length, properly angled and "whalebone tempered." The climbers are made broad and comfortable where the foot rests. They are made in sizes from 15 to 18 inches, inclusive.

Perfect Carriage Washers.

A. B. & W. T. Westervelt, 102 Chambers street, New York, are agents for the Perfect carriage washers, which are said to be a great convenience in washing all kinds of vehicles and motor cars. There are five styles, but all consist in the main of a water pipe revolving on a track 7 feet in diameter, which is firmly secured to the ceiling out of the way. With this pipe and a short attachment of rubber hose a man can readily get at any part of the vehicle and wash it thoroughly.

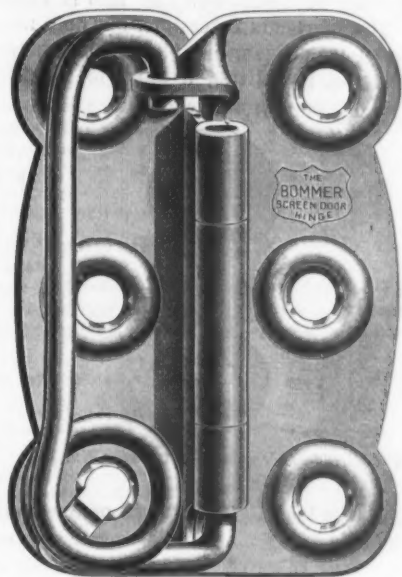
Crown Picture Hooks.

The Ossawan Mills Company, Norwich, Conn., manufacturer of braided and twisted picture wire, picture hooks, knobs, sash cord, &c., desires to call the attention of the trade to the fact that it is sole manufacturer of the Crown picture hooks and that every genuine Crown picture hook has the trademark of a crown stamped on the face of the hook.

Bommer Screen Door Hinge.

Bommer Brothers, 257-271 Classon avenue, Brooklyn, N. Y., are offering the wrought steel hold back screen door hinge shown herewith. The entire hinge consists of three parts only, the spring and pintle being made of a single piece of tempered steel wire. The door can be detached from the casing without removing the

screws by giving a few light taps with a hammer on the upper bend of the spring, where the spring is pulled off

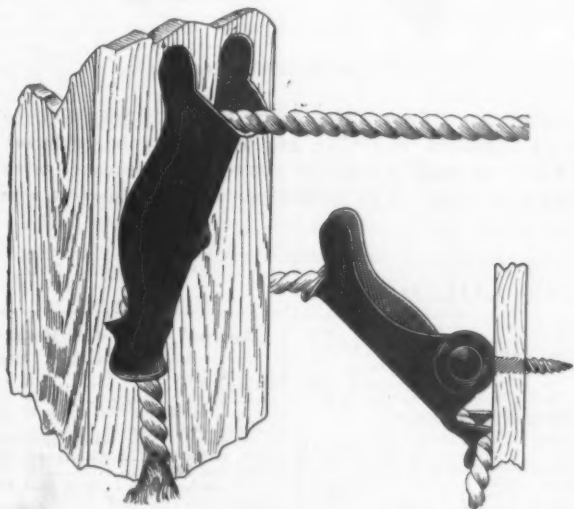


Bommer Screen Door Hinge.

the hook at the bottom. It is then pushed upward out of the eye by a few light taps on the lower bend of the spring, when the spring and pintle can be withdrawn. The hinges are packed without screws, one dozen in a box, one gross in a case.

The Star Sure Grip Clothes Line Fastener.

The enameled steel clothes line fastener shown in the accompanying illustration has a screw eye attached



The Star Sure Grip Clothes Line Fastener.

ready to screw into a building or post, the manner of attaching being shown in the cut to the right. The line can be quickly adjusted to and taken from the fastener



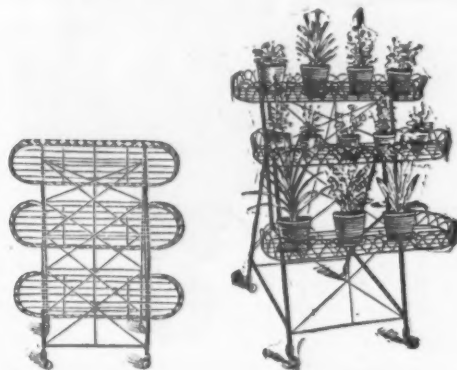
Stevens-Pope Rifle with Telescope.

from the side, thus saving drawing the entire line through the fastener. All slack is taken up by drawing down on the loose end of the line, which is shown at the bottom of the fastener to the left. The harder the pull and

strain on the main line the tighter the fastener holds. The fastener presses the line against the wood at one end between the teeth and also presses the teeth into the wood and obviates tying knots in the line. The device is offered by the Grand Rapids Grater Company, Grand Rapids, Mich.

Fall Specialties in Steel and Wire.

The accompanying illustrations represent designs of steel and wire goods put on the market by M. D. Jones & Co., 71-73 Portland street, Boston, Mass. The folding plant stand, Fig. 1, is made in a variety of sizes and



Folded.

Unfolded.

Fig. 1.—Folding Plant Stand.

patterns, finished in green and bronze. The folding feature is for convenience in shipping and economy of floor space. The safety swinging plant bracket, Fig. 2, is made in sizes to hold from one to four flower pots. In Fig. 3 is represented a fish globe and jardinière stand. In addition to the goods in this line shown the firm



Fig. 2.—Safety Swinging Plant Bracket.



Fig. 3.—Jardinière Stand.

makes swinging hooks for bird cages, lanterns, &c., and towel stands of white enameled steel with nickel plated rods.

Stevens-Pope Rifle with Telescope.

J. Stevens Arms & Tool Company, Chicopee Falls, Mass., is offering the Stevens-Pope rifle equipped with Stevens telescope, shown herewith. The rifle is furnished with 30 or 32 inch No. 4 octagon barrel, and has drop forged action, case hardened, double set triggers, fancy pistol grip, stock and forearm Pope model with cheek

piece extra high and so full as to be tight against the face; checked and varnished; special deep, snugly fitting butt plate; special three-finger lever; Pope sights and palm rest. The telescope is five power, about 16 inches

long, quickly removed and attached without changing the adjustments or necessitating removal of ordinary sights.

New Diamond Wide Mouth Reversible Carrier No. 11.

Whitman & Barnes Mfg. Company, Chicago, Ill., is offering the hay carrier shown in the accompanying



Fig. 1.—New Diamond Wide Mouth Reversible Carrier No. 11.

cuts. It is built to work on the company's Diamond steel track, and is made extra heavy and of best malleable iron. The locking device is positive in action, the fork



Fig. 2.—Bottom View of Carrier No. 11.

pulley entering the wide mouth of the car and on leaving the stop is firmly gripped by the locking dogs and held in a swinging position while traveling on the track.

The track wheels run on turned steel axles firmly fitted to the frame of the car. The rope wheels have chilled hubs and turn on bushings which fit into recesses of the car frame. The carrier is reversible, but does not swivel, and is referred to as being simple in construction, neat and compact, and permitting a barn to be filled with

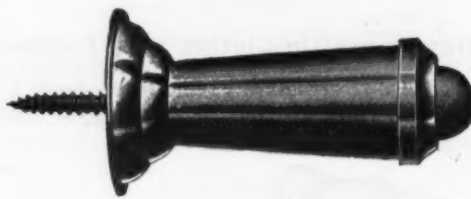


Fig. 3.—Fork Pulley for Carrier No. 11.

hay close up to the track. The weight of the carrier complete is 23 pounds.

The Champion Metallic Base Knob.

The Champion Safety Lock Company, Geneva, Ohio, manufactures the metallic base knob shown herewith. It is made of wrought steel, brass or bronze, finished to match other hardware, and has a square head screw riveted to its base so that it can be screwed into hard



The Champion Metallic Base Knob.

wood without injury. The rubber button is held in place by an ingenious fastening, and can easily be replaced. The knob is said to combine attractive appearance with great durability. It is packed one dozen to the box, one gross to the case.

PAINTS, OILS AND COLORS

White Lead, Zinc, &c.—

Lead, English white, in Oil.....	9 1/2 @ 3/4
Lead, American white, in Oil:	
Lots of 500 lb or over.....	@ 6 1/4
Lots less than 500 lb.....	@ 7
In Barrels.....	@ 6
Lead, White, in oil, 25 lb tin	
pails, add to keg price.....	@ 1/4
Lead, White, in oil, 12 1/2 lb tin	
pails, add to keg price.....	@ 1
Lead, White, in oil, 1 to 5 lb	
assorted tins, add to keg price.....	@ 1 1/4
Lead, American, Terms: For lots 12	
tons and over 1/4¢ rebate; and 2% for	
cash if paid in 15 days from date of	
invoice; for lots of 500 lbs. and over	
2% for cash if paid in 15 days from	
date of invoice, for lots of less than	
500 lbs. net.....	@ 6
Lead, White, Dry in bbls.....	@ 4
Zinc, American, dry.....	4 1/2 @ 1/4
Zinc, French:	
Paris, Red Seal, dry.....	8 1/2
Paris, Green Seal, dry.....	9 1/2
Antwerp, Red Seal, dry.....	7 1/2
Antwerp, Green Seal, dry.....	8 1/2
Zinc, V. M. French, in Poppy Oil:	
Green Seal:	
Lots of 1 ton and over.....	11 1/2 @ 12 1/4
Lots of less than 1 ton.....	12 @ 12 1/2
Zinc, V. M. French, in Poppy Oil:	
Red Seal:	
Lots of 1 ton and over.....	10 1/4 @ 11
Lots of less than 1 ton.....	10 1/2 @ 11 1/4
Discounts—French Zinc—Discounts	
to buyers of 10 bbl. lots of one or mixed	
grades, 1 1/2% 25 bbls., 2%; 50 bbls., 4%.	

Dry Colors—

Black, Carbon.....	5 @ 10
Black, Drop, Amer.....	4 @ 6
Black, Drop, Eng.....	5 @ 6
Black, Ivory.....	16 @ 20
Lamp, Com.....	4 1/2 @ 6
Blue, Celestial.....	4 @ 6
Blue, Chinese.....	29 @ 32
Blue, Prussian.....	27 @ 30
Blue, Ultramarine.....	4 1/2 @ 15
Brown, Spanish.....	1/2 @ 1
Carmine, No. 40.....	\$3.50 @ 3.60
Green, Chrome, ordinary.....	3 1/4 @ 6

Green, Chrome, pure.....	17 @ 25
Lead, Red, bbls., 1/2 bbls. and kegs:	
Lots 500 lb or over.....	@ 6 1/4
Lots less than 500 lb.....	@ 7
Litharge, American, bbls.....	6 @ 8 1/4
Ocher, American.....	\$8.50 @ 16.00
Ocher, American Golden.....	2 1/4 @ 3 1/4
Ocher, French.....	1 1/4 @ 2 1/4
Ocher, Foreign Golden.....	3 @ 4
Orange Mineral, English.....	8 @ 10
Orange Mineral, French.....	10 1/2 @ 12 1/4
Orange Mineral, German.....	8 @ 10
Orange Mineral, American.....	8 1/2 @ 8 1/4
Red, Indian, English.....	4 1/2 @ 5 1/4
Red, Indian, American.....	3 @ 3 1/4
Red, Turkey, English.....	4 @ 10
Red, Tuscan, English.....	7 @ 10
Red, Venetian, Amer.....	\$10.00 @ 11.25
Red Venetian, English.....	100 lb \$11.15 @ 11.75
Sienna, Italian, Burnt and	
Powdered.....	3 @ 9 1/4
Sienna, Ital., Raw Powder.....	3 @ 9 1/4
Sienna, American, Raw.....	1 1/2 @ 2
Sienna, American, Burnt and	
Powdered.....	1 1/2 @ 2
Talc, French.....	\$9 ton \$15.00 @ 30.00
Talc, American.....	\$9 ton \$15.00 @ 25.00
Terra Alba, French.....	\$100 lb \$9 @ 10.00
Terra Alba, English.....	\$100 lb \$9 @ 10.00
Terra Alba, American.....	\$100 lb \$9 @ 10.00
No. 1.....	60 @ 70
Terra Alba, American.....	\$100 lb \$9 @ 10.00
No. 2.....	45 @ 50
Umber, Flock, Brit. & Pow.....	2 1/2 @ 3 1/4
Umber, Turkey, Raw & Pow.....	2 1/2 @ 3 1/4
Umber, Burnt, Amer.....	1 1/2 @ 2
Umber, Raw, Amer.....	1 1/2 @ 2
Yellow, Chrome.....	11 @ 14
Vermilion, American Lead.....	18 @ 22
Vermilion, Quicksilver, bulk.....	@ 65
Vermilion, Quicksilver, bags.....	@ 65
Vermilion, English, Import.....	75 @ 80
Vermilion, Chinese.....	\$0.50 @ 1.00

Colors in Oil—

Black, Lampblack.....	12 @ 14
Blue, Chinese.....	26 @ 28
Blue, Prussian.....	26 @ 28
Blue, Ultramarine.....	32 @ 36
Brown, Vandyke.....	11 @ 14
Green, Chrome.....	10 @ 15
Green, Paris.....	@ 24

Sienna, Raw.....	12 @ 15
Sienna, Burnt.....	12 @ 15
Umber, Raw.....	11 @ 14
Umber, Burnt.....	11 @ 14

Miscellaneous—

Barytes, White, Foreign.....	\$ ton \$17.50 @ 19.00
Barytes, Amer. floated.....	\$ ton \$18.00 @ 19.00
Barytes, Crude, No. 1.....	\$ ton \$19.00 @ 21.00
Chalk, in bulk.....	\$ ton \$3.00 @ 3.25
Chalk, in bbls.....	\$ 100 lb @ 35
China Clay, English.....	\$ ton \$11.00 @ 17.00
Cobalt, Oxide.....	\$ 100 lb \$2.50 @ 2.60
Whiting, Common.....	\$ 100 lb \$4.30 @ 4.48
Whiting, Gilders.....	\$ 100 lb \$5.50 @ 5.65
Whiting, Ex. Gilders.....	\$ 100 lb \$5.50 @ 5.65

Putty, Commercial—

In bladders.....	\$1.70 @ 1.75
In bbls. or tubes.....	1.10 @ 1.15
In 1 lb to 5 lb cans.....	2.60 @ 2.90
In 12 1/2 to 50 lb cans.....	1.40 @ 1.55

Spirits Turpentine—

In Oil bbls.....	64 @ 64 1/2
In machine bbls.....	64 1/2 @ 65

Glue—

Cabinet.....	11 @ 15
Common Bone.....	15 @ 24
Extra White.....	11 @ 14
Foot Stock, White.....	8 @ 11
Foot Stock, Brown.....	8 @ 11
German Hide.....	12 @ 18
French.....	10 @ 10
Irish.....	13 @ 16
Low Grade.....	9 @ 12
Medium White.....	14 @ 17

Gum Shellac—

Bleached Commercial.....	35 @ 37
Bone Dried.....	45 @ 47
Button.....	56 @ 65
Diamond I.....	45 @ 47
Fine Orange.....	39 @ 40
A. C. Gamet.....	65 @ 66
Octagon B.....	@ 62
T. N.....	42 @ 43
V. S. O.....	58 @ 60

Animal, Fish and Vegetable Oils—

Linseed, City, raw.....	54 @ 55
Linseed, City, boiled.....	56 @ 57
Linseed, State and West'n raw.....	52 @ 53
Linseed, raw Calcutta seed.....	@ 62
Lard, Extra Prime, Winter.....	50 @ 60
Lard, Extra No. 1.....	47 @ 48
Lard, No. 1.....	35 @ 39
Cotton-seed, Crude, f.o.b. mills.....	23 @ 23 1/2
Cotton-seed, Summer Yellow.....	30 @ 30 1/2
off grades.....	@ 30 1/2
Sperm, Crude.....	55 @ 56
Sperm, Natural Spring.....	@ 56
Sperm, Bleached Spring.....	@ 56
Sperm, Natural Winter.....	60 @ 63
Sperm, Bleached Winter.....	63 @ 65
Tallow, Prime.....	51 @ 53
Whale, Crude.....	44 @ 46
Whale, Natural Winter.....	42 @ 44
Whale, Bleached Winter.....	44 @ 46
Menhaden, Brown, Strained.....	28 @ 29
Menhaden, Light, Strained.....	29 @ 30
Menhaden, Bleached, Winter.....	31 @ 32
Menhaden, Ex-Bld. Winter.....	32 @ 33
Menhaden, Southern.....	16 1/2 @ 17
Cocoonut, Ceylon.....	\$ lb 6 1/2 @ 6 1/4
Cocoonut, Cochon.....	\$ lb 7 1/4 @ 7 1/2
Cod, Domestic, Prime.....	34 @ 36
Cod, Newfoundland.....	30 @ 31
Red, Elaine.....	32 @ 33
Red, Saponified.....	\$ lb 4 1/2 @ 4 1/4
Olive, Italian, bbls.....	57 @ 60
Neatsfoot, prime.....	43 @ 45
Palm, Logos.....	\$ lb 5 1/2 @ 5

Mineral Oils—

Black, 29 gravity, 25 @ 30 cold test.....	10 1/4 @ 11 1/4
Black, 29 gravity, 15 cold test.....	11 1/4 @ 12 1/4
Black, Summer.....	10 1/2 @ 11 1/4
Cylinder, light filtered.....	18 @ 19
Cylinder, dark filtered.....	16 @ 17
Paraffine, 305-307 gravity.....	12 1/2 @ 13
Paraffine, 303 gravity.....	11 1/2 @ 12
Paraffine, 283 gravity.....	9 1/4 @ 9 1/2
Paraffine, Red.....	11 1/2 @ 13
In small lots 1/4¢ advance.	

CURRENT METAL PRICES.

SEPTEMBER 6, 1905.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:	
1 to 1 1/2 in. round and square.....	per lb 1.05¢
1 1/2 to 4 in. x 1/2 to 1 in.....	per lb 2.15¢
1 1/2 to 4 in. x 1/2 to 5-16.....	per lb 2.15¢
Rods—1/2 and 11-16 round and square.....	per lb 2.15¢
Angles:	
8 in. x 1/2 in. and larger.....	per lb 2.50¢
8 in. x 3/4 in. and 1/2 in.....	per lb 2.50¢
1 1/2 to 2 1/2 in. x 1/2 in.....	per lb 2.25¢
1 1/2 to 2 1/2 in. x 3-16 in. and thicker.....	per lb 2.20¢
1 to 1 1/2 in. x 3-16 in.....	per lb 2.25¢
1 to 1 1/2 in. x 1/2 in.....	per lb 2.20¢
3/4 x 1/2 in.....	per lb 2.45¢
3/4 x 3/4 in.....	per lb 2.55¢
3/4 x 1 in.....	per lb 3.60¢
1/2 x 3-16 in.....	per lb 4.10¢
Tees:	
1 in.....	per lb 2.55¢
1 1/4 in.....	per lb 2.55¢
1 1/2 to 2 1/2 in.....	per lb 2.55¢
8 in. and larger.....	per lb 2.55¢
Beams:	
Channels, 8 in. and larger.....	per lb 2.50¢
Bands—1 1/2 to 6 x 3-16 to No. 8.....	per lb 2.30¢
"Borden's Best" Iron, base price.....	per lb 3.05¢
Burden's "H. B. & S." Iron, base price.....	per lb 2.85¢
"Ulster".....	per lb 3.10¢
Norway Bars.....	per lb 3.30¢
Norway Shapes.....	per lb 3.90¢

Merchant Steel from Store—

Bessemer Machinery.....	per lb 1.95¢
Toe Calk, Tire and Sleigh Shoe.....	per lb 2.50¢@3.00¢
Best Cast Steel, base price in small lots.....	per lb 7¢

Sheet Iron from Store—

Black.

	One Pass, C.R. Soft Steel.	R. G. Cleaned.
No. 14.....	per lb 2.50¢	2.60¢
Nos. 18 to 21.....	per lb 2.65¢	2.80¢
No. 27.....	per lb 2.80¢	3.10¢
No. 28.....	per lb 2.90¢	3.30¢

Russia, Planished, &c.

Genuine Russia, according to assort- ment.....	per lb 11 1/4¢@14¢
Patent Planished.....	per lb A, 10¢; B, 9¢, net.

Galvanized.

Nos. 14 to 18.....	per lb 2.85¢
Nos. 22 to 24.....	per lb 3.25¢
No. 27.....	per lb 3.70¢
No. 28.....	per lb 3.95¢
No. 20 and lighter 36 inches wide, 25¢ higher.	

METALS—

Tin—

Straits Pig.....	per lb 32¢ @32 1/4¢
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Tin Plates—

American Charcoal Plates (per box.)

A.A.A. Charcoal:	
IC, 14 x 20.....	5.95
IX, 14 x 20.....	7.30

A. Charcoal:

IC, 14 x 20.....	5.30
IX, 14 x 20.....	6.30

American Coke Plates—Bessemer—

IC, 14 x 20.....	108 lb. \$4.30
IX, 14 x 20.....	5.30

American Terne Plates—

IC, 20 x 28.....	\$8.50
IX, 20 x 28.....	10.50

Copper—

Lake Ingot.....	per lb 17 1/4¢@17 1/2¢
Castings.....	per lb 16 1/2¢@17¢
Sheet Copper Hot Rolled, 16 oz.....	per lb 21¢
Sheet Copper Cold Rolled, 1¢ per lb advance over Hot Rolled.....	per lb 12¢
Sheet Copper Polished 20 in. wide and under, 1¢ advance over Cold Rolled.....	
Sheet Copper Polished over 20 in. wide, 2¢ advance over Cold Rolled.....	per lb 25¢ basis
Bottoms, Pits and Flats.....	per lb 25¢ basis
Planished Copper, 1¢ per lb more than Polished.....	

Seamless Brass Tubes—

		Outside Diameter.		Net.		Base Price 20¢	
Stubs	W. G.	1/4	5-16	3/8	7-16	1/2	9-16
4-11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Iron Pipe Sizes—Brass

1/4	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	6	inch
28	27	22	21	20	20	20	20	20	21	22	24	26	27	per lb

Braze Brass Tubing.

Discount from List June 6, 1898, 33 1/3%.

Bronze and Copper Tubing advance on Brass List 3¢

Roll and Sheet Brass—

Discount from List June 6, 1898, 25%.

Spelter—

Western..... per lb 6.25¢@6.35¢

Zinc.

No. 9, base, casks, per lb 8.00¢ | Open..... per lb 8.50¢

Lead.

American Pig..... per lb 5.12 1/2¢@5.25¢

Bar..... per lb 6.00¢@6.25¢

Old Lead in exchange, 4¢ per lb

Solder.

1/2 & 1/2, guaranteed..... per lb 20 1/2¢@21 1/4¢

No. 1..... per lb 18 1/2¢@19 1/4¢

Refined..... per lb 17 1/2¢@18

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson..... per lb 15¢

U. S..... per lb 14 1/2¢

Hungarian and Japanese..... per lb 14¢

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot

for remelting:

Small lots..... per lb 37¢

100-lb lots..... per lb 35¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper..... per lb 14¢

Light and Fanned Copper..... per lb 13¢

Heavy Brass..... per lb 9¢

Light Brass..... per lb 8¢

Lead..... per lb 4.25¢

Tin Lead..... per lb 4.00¢

Zinc..... per lb 4.00¢

No. 1 Pewter..... per lb 21¢

No. 2 Pewter..... per lb 8¢

Pure Aluminum, Sheet..... per lb 21¢

Tin Plate Scrap..... per ton \$5.00

Wrought Scrap Iron..... per gross ton \$15.50@16.00

Heavy Cast Scrap..... per gross ton \$13.75@14.00

Stove Plate Scrap..... per gross ton \$12.50@13.00

THE IRON AGE

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